A RESEARCH STUDY COMMISSIONED BY THE ONTARIO MINISTRY OF EDUCATION

Bilingual/Bicultural Education for Deaf and Hard-of-Hearing Students

A Review of the Literature on the Effects of Native Sign Language on Majority Language Acquisition

Principal Investigators:
Neita Israelite
Carolyn Ewoldt

Co-investigator:
Robert Hoffmeister

Ontario Ministry of Education

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ABSTRACT

This report is a review of the literature surrounding the issue of native sign-language acquisition in deaf children and its relation to proficiency in the majority language, as well as academic achievement and social development.

The report addresses the following areas: 1) review and summarization of research findings regarding the effects of native sign languages on majority languages; 2) advantages and disadvantages of native sign languages as an instructional strategy to support acquisition of majority languages; 3) characteristics of deaf students for whom this approach is indicated; 4) review and summarization of existing educational programs which make use of native sign languages to support majority-language acquisition. These areas are investigated through a review of several critical aspects of native sign-language acquisition.

Chapter 1 delineates the scope of the report and relevant operational definitions.

Chapter 2 which focuses on comparative studies of deaf children of deaf parents and deaf children of hearing parents, reviews findings for these two groups on communication competence, speech reception and production, and reading and writing in the majority language. In chapter 3, a review of the acquisition of native sign-language structures by deaf children of deaf parents briefly describes the process, pointing out its similarities to oral-language acquisition by hearing children.

Chapter 4 describes the literature on interactions of deaf children with deaf mothers, deaf children with hearing mothers, and hearing children with hearing mothers. Results suggest a continuum of desirable mother-child interactions.

Educational issues related to native sign language versus sign systems mapped onto oral languages are presented in chapter 5. A number of studies indicate that teachers who use simultaneous communication frequently delete significant portions of their intended message. Deaf students are not only capable of maximizing this impoverished input, but also of operating on it to create a workable, albeit incomplete, communication system through the process of nativization.

Next, chapter 6 investigates the ability of deaf students to access print without mediation through oral language and examines the effects of native sign language on reading and writing proficiency. Studies related to the context provided by reading materials are also presented, to show that deaf children, when provided with sufficient contextual support and background knowledge, are capable of learning the written majority language through reading.

Chapter 7 applies the bilingual/bicultural model proposed by Cummins to education of the deaf. Socio-historical factors pertaining to the Deaf as a cultural and linguistic minority provide a framework for a presentation of current thinking with regard to the use of native sign languages in school settings. A concluding section describes bilingual/bicultural programs in North America, Scandinavia, and Europe, and provides research results where available. Parent-training components of such programs are also reviewed.

Chapter 8 provides a summary and culminating discussion of the literature reviewed in this report.

Bilingual/Bicultural Education for Deaf and Hard-of-Hearing Students

I - INTRODUCTION

This report is a review of the literature surrounding the issues of native-language acquisition in deaf children and its relation to proficiency in a majority language, as well as academic achievement and social development. Where possible, the discussion includes LSQ (Langue des Signes Quebecois); however, little information is available on this native sign language.

The report will address the following issues, as laid out in the Ministry contract:

1. Review and summarization of all research findings pertinent to the effects of native sign languages on the acquisition of majority languages.

   This, in essence, is the bulk of the report. The section devoted to the comparison of deaf children of deaf parents and deaf children of hearing parents reviews the effects of the parental language on communicative competence, speech reception and expression, and reading and writing in the majority language, as well as communicative competence in the native language. In addition, sections on acquisition of certain structures in native sign language, mother-child interaction in sign language and other systems, and effects of native sign language on literacy in the majority language are included.

2. Advantages and disadvantages of native sign language used as an instructional strategy to support acquisition of the majority language.

   As empirical studies which contra-indicate the use of native sign language as the mode of instruction are unavailable in the literature, the "common sense" views regarding this issue are delineated. With regard to the advantages of using a native sign language, empirical and theoretical research supporting the notion that oral and total communication approaches leave most deaf children with less-than-optimal input are described, and studies that find deaf children creolizing this input into a workable, albeit incomplete, communication system are summarized. Also included are studies comparing orally trained deaf children with signing deaf children, showing some of the effects of methods which attempt to teach the majority language directly.

3. Characteristics of deaf students for whom native sign-language instruction to support majority-language acquisition is indicated.

   Research into the use of native language to support majority-language acquisition, while just beginning with regard to sign languages, is becoming an active area of inquiry as it pertains to hearing minority students learning majority languages. This research, along

with the sign language research, provides support for a bilingual/bicultural model. While more research is obviously needed, this model and its implications for education of the deaf are presented.

4. Review and summarization of the literature on existing educational programs which make use of native sign language to support majority-language acquisition.

   The problem of the paucity of literature in this area is addressed by applying a bilingual/bicultural model of education to the question and discussing the need for documentation of existing programs and the development of more programs within this model. Instructional programs which use native sign language and programs that teach native sign language to parents of deaf children are also presented.

Scope of the Report

Research in native sign language has taken three forms: quantitative, qualitative, and theoretical reviews. All three types are included in this report, as well as work that would not fall under the heading of research. The rationale for including the latter is that such writings are a reflection of the thinking of people in the field at a particular time, and, as such, provide a context for the research and a sense of the climate within which certain studies were undertaken.

The search for papers and programs extended across Canada and around the United States, to Sweden, France, Italy, Denmark, Israel, The Netherlands, England, Belgium, Australia, Finland, Spain, The Soviet Union, Germany, and Switzerland. Upon hearing of the purpose, everyone contacted responded with warmth and co-operation, and more names and sources were made available than it was possible to pursue within the time limit of the contract. This response provides evidence (in addition to what has been written) for the receptiveness of many in the field of deafness to discussion concerning the use of native sign languages.

There appear to be several explanations for the paucity of available literature regarding bilingual/bicultural programs for the deaf. One explanation is that programs using native sign language have just begun to appear. Unlike the precipitous move to mainstreaming deaf children, which was accomplished with almost no research base (Ewoldt 1979), the move to the use of native sign language in the classroom is just emerging from a base of theory and research into the advantages of native language for deaf people. It now appears that the climate is right for initiating these programs.

However, the search for reports of such programs has been complicated by a worldwide lack of financial support for deafness research (as evidenced by the fact that few programs have been formally evaluated) and too few outlets for dissemination of information about deafness. There are relatively few journals related to deafness, and papers pertinent to this report were often not found in conventional places. (The turn-around time for articles

accepted by American Annals of the Deaf is at least two years. Thus, the small number of articles available on programming could be due in part to a logjam of papers still awaiting publication.)

Operational Definitions

Language is the central factor in communication, and one of the main influences on children's learning. The term is a theoretical one, referring to the structured communication of meaning; that is, communication that is produced in such a way that its form is predictable. A community that uses a given language shares that language base, as well as the knowledge that their language is predictable. This fact assures comfortable communication among community members (Hoffmeister 1988). As well, this aspect of predictability is essential for the children of a community to acquire the language.

A native language is a shared language that is naturally acquired and used by a child. It is primary, not only because it is the first language but also because it takes on life-long importance for the individual (Klein 1986).

According to the United States Bilingual Education Act of 1987, "Native language when used with reference to an individual of limited English proficiency, means the language normally used by the individual."

In their interpretation of this definition as it pertains to deaf students, the Commission on Education of the Deaf indicates the following: "the wording makes clear that children whose primary language is ASL [American Sign Language], whether or not they learned it from their parents, are directly affected." (1988, p. 41)

The learning of another language is to acquire a secondary language. It is rare that a person controls form and function equally in both languages. Cummins (1984, 1986) suggests that children who must use the secondary language as the principal means of acquiring knowledge will have difficulty learning in school. English or French would constitute the secondary language for those Canadian deaf children who do not normally use one or the other as their primary language.

The term majority culture is not clearly defined in the educational and political spectra of deafness. A "majority culture" implies the culture in which people participate when they reach adulthood. In the case of deaf people, many will gravitate toward the Deaf community with its own culture (Padden and Humphries 1988). Thus, the predominant culture for many deaf people will be a minority culture, even though knowledge of the majority culture and language are necessary for economic and political (and social and familial) reasons.

Majority language, as used in this report, refers to the language of the majority culture, which is undeniably important for deaf as well as hearing people, regardless of whether they perceive themselves to be members of that culture. Thus, knowledge of the majority language, which is a secondary language for many deaf people, is the prominent goal of education.

American Sign Language (ASL) is the native sign language of many English-speaking deaf people in Canada and the United States. In Canada, there are several Canadian dialects of ASL which share much in common with each other and with dialects of ASL used in the United States. ASL is a visual-spatial language that is usually learned through a peer transmission process rather than from an intergenerational passage between families. Since less than 10% of deaf persons have deaf parents (Moores 1987), and since most schools do not formally teach or recognize ASL, the major source available to deaf children is other deaf children. The most-fluent users of ASL are children with deaf parents and children with hearing parents who attended residential schools for the deaf from the age of 5 or 6. These children are the native or near-native users of this sign language and the guarantors of its survival. Many Canadian deaf people learned ASL from having attended Gallaudet University in the United States. ASL, as used in this report, refers to the family of dialects used by deaf persons in English-speaking North America. Sign language or native sign language are used as the generic terms, unless otherwise specified in the research being reported.

Langue des Signes Quebecoise (LSQ) is the sign language used by the Francophone Deaf community. LSQ is said to be a product of ASL and French Sign Language (LSF). Its roots can be traced to l'Institut des Sourds-Muets, where deaf boys were taught by monks influenced by LSF. In l'Institut des Sourdes-Muettes, the school for deaf girls, deaf nuns from the United States used ASL. It is not possible to determine when the two systems merged and came into general use in the Deaf community outside the schools (Mayberry 1978), but the result of this merger and use was LSQ, a language distinct in lexicon and grammar from spoken French, as well as from ASL (Petitto and Charron 1987).

The past twenty years have witnessed a rapid increase in programs using total communication (TC) as the philosophy of instruction and simultaneous communication (SC), which is used in TC programs. SC retains the auditory input and adds visual information through the use of one of the artificially created forms for representing English. These invented systems go by many names, but for this report sign English is used as the generic term unless a different system is referred to in one of the studies presented.

Throughout this paper the term Deaf has been capitalized when it refers to the Deaf community, whereas deaf is used for individuals who have a hearing loss.

II - COMPARATIVE STUDIES OF DEAF CHILDREN WITH HEARING PARENTS AND DEAF CHILDREN WITH DEAF PARENTS

This chapter reviews major studies comparing deaf children with deaf parents (DCDP) and deaf children with hearing parents (DCHP) in an attempt to understand the relationship between early manual communication and academic and social development.

Most of this work was carried out over a period of approximately ten years, beginning in the mid-1960s. "The investigators reasoned that if the use of manual communication were harmful, then deaf children of deaf parents would be inferior in academic achievement, in psycho-social adjustment, and in all aspects of communication, including speech, speechreading, reading and writing" (Moores 1987, p. 198). Most results, however, did not support this hypothesis. Instead, DCDP outperformed DCHP in academic achievement, reading and writing, and social development. As well, few differences in speech and speechreading were noted. Later comparisions of DCDP and DCHP, conducted in the late 1970s and early 1980s, confirmed these findings.

The term manual communication is generally poorly defined in these studies. However, it can be taken to mean the sign language used by deaf parents to communicate with their children and could include native sign language, pidgins, and manually coded forms.

It cannot be assumed that DCHPs in these studies used oral communication as their preferred communication modality. Many of the deaf subjects in the studies conducted from the mid-1960s to the mid-1970s attended residential schools where native sign language was the lingua franca outside of the classroom. As well, Lou (1988) reports that during the 1960s there was renewed interest in the Rochester Method (simultaneous fingerspelling of all spoken words) in some schools; and by the early 1970s several systems of manually coded English had been developed and put into use (Seeing Essential English, 1971; Signing Exact English, 1972).

One explanation offered for the success of the DCDPs in these studies is that a deaf child born into a family with deaf parents experiences natural and smooth communication. As well, deaf parents typically accept deafness in their child as natural (Brasel 1975; Corson 1973; Mindel and Vernon 1972). This acceptance of their child's deafness results in an environment comparable to that experienced by hearing children in hearing families (Wilbur and Jones 1974).

Discussion continues as to other reasons contributing to the superior performance of DCDP, including 1) genetic factors; 2) positive effects of early manual communication; and 3) general lack of additional disabilities in DCDP.

In a study that was not designed to investigate DCDP directly, but rather to examine the effects of institutionalization, Quigley and Frisina (1961) reported that 16 DCDP out of 120 day students were significantly superior to DCHP in English vocabulary and fingerspelling. No significant differences were reported between the two groups in speechreading.

Stevenson (1964), using the historical records of DCDP enrolled at the California School for the Deaf at Berkeley between 1914 and 1961, compared the educational achievement of DCDP to the achievement of DCHP. In a matched sample of 134 DCDP (manual) and 134 DCHP (oral), Stevenson found that 38% of the manual group went to college, compared to only 9% of the oral group.

Stuckless and Birch (1966), in a matched-pair design, compared 38 DCDP and 38 DCHP from five different residential schools for the deaf. Subjects were matched on the following variables: sex, age, hearing loss, age of school entrance, and IQ scores. Significant differences were found in reading level, speechreading and written-language scores in favour of DCDP. On teachers' ratings of speech production and psycho-social development, no significant differences were found.

Meadow (1968), in a study similar to Stuckless and Birch, used a matched-pair design in which 59 DCDP were matched with 59 DCHP enrolled at the California School for the Deaf in Berkeley, a residential school. Matching was based primarily on age, sex, I.Q. scores, and degree of hearing impairment. Most of the pairs were "satisfactorily" matched on family size and on occupation of the fathers.

Using a rating scale which included items dealing with intellectual, social, and communicative functioning, Meadow found that when DCDP were compared with DCHP, the DCDP as a group had significantly superior intellectual and social functioning and received significantly higher ratings for facility with written language (English), receptive and expressive fingerspelling, and the use of sign language. She found the mean difference between the two groups on the Stanford Achievement Test (SAT) to be 2.1 years for reading, 1.3 years for arithmetic, and 1.3 years for overall grade-level scores. In each case, the DCDP group was favoured. However, no differences were found between the two groups in speechreading and speech. Meadow concluded that none of the evidence from the research reported above would seem to justify the strong injunctions placed by professional educators on the use of manual communication by parents of young deaf children.

The implications of these findings had great influence and played a crucial role in the historical transition of the educational system from a dominant oral methodology to one that would use manual communication as a major part. In the early 1970s, studies began expanding upon previous work comparing DCDP and DCHP. Vernon and Koh (1970), stated that "some of the superiority of the early manual groups may be questioned because possible undetected neurologic dysfunction in the controls might have adversely affected their performance." (p. 527)

Thus, etiology was controlled in Vernon and Koh's (1970) study by selecting subjects with genetic deafness. Seventy-nine DCDP were classified as the early manual group (their parents having used manual communication with them from infancy), and 190 DCHP were classified as the early oral group (their parents having used oral communication with them from infancy). All were students from the California School for the Deaf. All subjects had congenital hearing losses of 70dB or greater in the speech range, and they were matched according to I.Q., sex, and chronological age. Thirty-two matched pairs were finally derived from the above population, and their SAT scores were compared on the Word Meaning and Paragraph Meaning subtests, on reading average, and on the overall test-battery average. They were also assessed on writing, speech and speechreading, and psychological adjustment, based on teachers' and counsellors' ratings.

On the SAT, the early manual group's general achievement was higher on the average by 1.44 years, a statistically significant difference. With regard to communication, the early manual group was significantly superior in written language, reading, and vocabulary. There was no significant difference between the groups on psychological adjustment. Vernon and Koh (1970), in discussing their findings and relating them to findings of previous research (Meadow 1968; Stuckless and Birch 1966), attributed the superiority of DCDP to early exposure to manual communication. They also pointed out the lack of "solid information about the relative acceptance or rejection of deaf children as a function of the hearing of the parents." (p. 535) Whether this variable affected the development of the children in these studies still remains a question in the literature.

Several studies have looked at the effects of early childhood education for deaf children. Phillips (1963) suggested that by age 9 there were no differences between deaf children with preschool experience and deaf children with no such experience. However, one of the groups in Phillips' study, the manual group, demonstrated better linguistic proficiency than the oral preschool and non-preschool groups. Craig (1964) showed that deaf children with and without preschool training exhibited no differences in speechreading and reading.

In a recent longitudinal study of Canadian preschool children, Musselman, Wilson, and Lindsay (1988) concluded that neither age of intervention, program intensity, nor parent instruction affected children's linguistic and social development. However, as the authors noted, the study was limited in that qualitative aspects of programming and parent instruction were not considered.

Vernon and Koh (1971) studied every graduate of the John Tracy Clinic (a pioneer program in early oral education for deaf children) from 1944 through 1968, who later attended the California School for the Deaf in Riverside. They compared these students with DCDP and DCHP who had no preschool training. The three groups were compared in academic achievement and communication. The DCDP group were disadvantaged with regard to parental socio-economic status and educational level. In addition, they did not have early amplification or professional services. The DCDP also had lower intelligence scores. (The Tracy Clinic subjects had a mean I.Q. of 114 and represented the upper 20% of the

population.) Despite these disadvantages, the DCDP group outscored the other two groups and were rated superior in reading. There were no differences in speech or speechreading. From this, Vernon and Koh concluded that oral preschool experience had no effect on academic performance.

To test the results of previous research which maintained that manual communication is the primary factor explaining the superiority of DCDP, Corson (1973) compared four groups of deaf children on academic achievement, social adjustment, self-image, speech intelligibility, speech-reading, parental expectations, and parental opinions toward deafness. The four groups (10 children in each group) were : 1) DCDP using manual communication and attending the American School for the Deaf; 2) DCDP using oral communication and attending the Clarke School for the Deaf; 3) DCHP attending the American School for the Deaf; and 4) DCHP attending the Clarke School for the Deaf. Corson found that DCDP in both schools were significantly superior to DCHP in reading, arithmetic, and speechreading. In addition, the two groups with deaf parents were significantly higher in acceptance of deafness. He concluded that the use of manual communication alone did not seem to be an adequate explanation. Instead, parental acceptance of deafness was a more "plausible explanation to describe the phenomena of the superior performance of DCDP." (p. 135)

Although Corson claimed he controlled for early manual-linguistic input, 33 of his 40 subjects had deaf siblings and only one of the children of oral deaf parents had no deaf siblings. The ages of deaf siblings were not reported. In addition, Corson acknowledged that the oral-deaf parents were conversant in manual communication. Therefore, the influence of uncontrolled manual input for the subjects is unknown. As shown in a later study by Zwiebel (1987), deaf children with deaf siblings (and hearing parents) from homes using mixed communication (primarily oral) were equal to hearing children on cognitive tasks.

It is equally important that the oral-deaf parents used gestures when communicating with their deaf children and that these gestures differed from the ones used by hearing parents. Results of research by Manfredi and Fruggeri (1978) and DeVilliers (1988), described below, suggest that the use of gestures by hearing parents and deaf parents who are oral, influence the development of deaf children's academic competence and the majority language.

Although they did not study DCDP, the work of Manfredi and Fruggeri (1978) is appropriate to mention here. They researched 25 hearing families in Italy with 5-year-old deaf children and reported that the best parenting was done by mothers who used gestures and other non-verbal means of communication with their children, even when speech was the primary means of communication between parents and child. The children in these families were found to have normal or near-normal scores on language tests, as opposed to other children in the study, who showed extreme variability in test results and whose mothers were

concerned about teaching them to speak and used fewer non-verbal gestures. Manfredi and Fruggeri concluded that parents who are the most involved with teaching speech to their children, ignore other important means of communication and interfere with the development of language and satisfying relationships.

DeVilliers (1988) compared the use of gestures in deaf children of deaf mothers, deaf children of hearing mothers and hearing mothers of hearing children. She included measures of various types of gestures (deictic, iconic, attention-getting, conventional, idiosyncratic, or sign), the various roles of gestures (complementary or supplementary), and their pragmatic intent. DeVilliers concluded that profoundly deaf individuals who are oral, exploit the visual modality of gesture, parallel to speech, apparently to increase their chances of being understood by their children.

Brasel (1975), questioning the appropriateness of the language-input variables of previous research, conducted a study of 72 subjects, grouped into four categories according to the reported language competence of their parents and the kind of language environment provided: 1) Manual English; 2) Average Manual; 3) Intensive Oral; and 4) Average Oral. Three instruments were employed: 1) the Test of Syntactic Ability; 2) the reading and language subtests of the SAT; and 3) a set of four sequential pictures to elicit written-language samples. Mean scores of the two manual groups combined were significantly superior to the two oral groups on all measures. In addition, there were no significant differences between the Average Manual and the Intensive Oral groups, even though children in the latter group came from more advantaged backgrounds.

In the late 1970s and early 1980s, scholars in other countries were conducting similar research, and their findings concurred with those in the United States. A study conducted in a school for the deaf in Denmark (Hansen and Kjaer-Sorensen 1976) investigated the sign communication of 23 deaf children between the ages of 6 and 15. The children were to tell a peer the content of a series of pictures of different degrees of complexity. The children were videotaped, and their language was analysed. DCDP were better able to communicate about the pictures, using less pantomime and more conventional signs than their age mates who had hearing parents.

In Israel, Zwiebel (1987) designed a study to test the hypothesis of Kusche and colleagues (1983) that children who are deaf for genetic reasons are superior to other children (deaf and hearing) because of the evolutionary process. Zwiebel hypothesized that if children who were deaf from genetic causes (despite communication mode) scored higher than non-genetically deaf children, the genetic factor and not the communication factor could be seen as the reason for the higher development. He randomly selected 122 deaf boys and 121 deaf girls, ages 6 to 14, from a population of 403 deaf Israeli children. They were divided into the following three groups: 1) 23 genetically deaf children in homes using manual communication, with deaf parents and deaf siblings (DpDs); 2) 76 genetically deaf children in homes using mixed communication (primarily oral), with hearing parents and deaf siblings

(HpDs); 3) 144 non-genetically deaf children in homes using oral communication, with hearing parents and hearing siblings (HpHs). He also included a group of 101 hearing children in grade 6, from a variety of SES (socio-economic status) backgrounds.

Cognitively, the deaf children excelled when exposed to manual communication. They appeared to understand their parents better and absorb stimuli and information better when manual communication was used in the home. The DpDs group were equal to the hearing children in cognition and superior to the deaf children who did not know and use manual communication. The HpDs group also equalled the hearing children, indicating that even minimal exposure to manual communication was beneficial.

Zwiebel concluded that genetic background does not make a difference; rather, it is exposure to manual communication that is responsible for the superior performance of deaf children with deaf parents. He further stated that deaf parents provide the language base necessary to foster deaf children's development of an appropriate, competent, and adequate level of thinking. These results conflict with research conducted by Kusche et al. (1983) who concluded that genetically deaf children are superior to hearing children, due to good visual skills as a consequence of the evolutionary process.

A study by Weisel (1988) included 124 deaf elementary school students enrolled in special education classes in Israel. Thirty-one children had two deaf parents, and 93 had hearing parents. The cause of deafness was genetic for all children, and no additional disabilities were present. The average hearing loss was 100.2dB for the DCDP group and 96.3dB for the DCHP group. Three instruments were used: 1) A parent questionnaire investigated SES (socio-economic status), method of communication used at home, other deafness in the family, and etiology. 2) Social-emotional adjustment was measured using the Hebrew translation of the Meadow-Kendall Social-Emotional Assessment Inventory for deaf students, with some modifications. This assessment was completed by the students' teachers. 3) The Ortar Test of Reading Comprehension was included to assess reading achievement and was administered by classroom teachers. It included two levels: Level 1 = Grades 1-4 and Level 2 = Grades 5-8. (The test is normed for hearing students.)

On the Ortar Test of Reading Comprehension the deaf students scored below the hearing norms, but the DCDP group scored higher than the DCHP group by .57 of a year. In addition, scores of emotional adjustment, self-image, and motivation to communicate favoured the DCDP group over the DCHP group. The results were statistically significant in four of the five measures: reading comprehension, emotional adjustment, self-image, and motivation to communicate. No difference was found between the two groups in social adjustment. It is interesting to note that the DCDP group outscored the DCHP group, despite the higher SES of the latter. (SES is typically a critical factor in influencing student performance.) The results of this study indicate that environmental factors (i.e., exposure to a sign language at an early age) play a critical role in the academic and psychological functioning of deaf children.

In an effort to provide information about the linguistic competence and social-emotional development of Greek deaf children, a comparative study of DCDP and DCHP was conducted by Kourbetis (1987). This was the first formal study investigating Greek deaf children's language (signed, spoken, or written) development. A signed language is not used pedagogically in Greece; however, Greek deaf children appear to use Greek Sign Language as their preferred mode of communication (Kourbetis 1982; Kourbetis, Hoffmeister, and Greenwald 1985).

Thirteen DCDP and thirteen DCHP were matched on the following variables: chronological age, age at onset of deafness, school setting, hearing loss of at least 70dB in the better ear, scoring 80 or better on the Raven's Non-Verbal Scale, and no additional handicaps. The DCDP group was exposed to manual communication from infancy, and the DCHP group did not learn to sign until they started school. Subjects were selected from four different school settings--three public oral residential-day programs and one private oral day program.

Three assessment tools were used : 1) a receptive communication scale; 2) an expressive communication scale; and 3) the Meadow-Kendall Social- Emotional Adjustment Inventory (SEAI), which was translated into written Greek. The expressive and receptive scales, based on a communication battery developed by Moores, Weiss, and Goodwin (1978), tested spoken and written Greek and Greek Sign Language (GSL). These measures were translated into Greek for both languages and modes.

The results of this investigation were similar to those from the United States and other countries; however, differences were noted on three subscales of the SEAI. One divergent finding was "no significant difference" in the social adjustment of DCDP and DCHP. Meadow's study (1968) had shown that DCDP scored higher than DCHP in social adjustment. The second difference in the Kourbetis (1987) study was that the Greek DCDP were significantly superior to DCHP on self-image, as opposed to Corson's (1973) study which showed no significant differences. It is interesting to note the third divergent finding--that there were significant differences in speechreading ability in favour of DCDP. Typical studies from the United States showed no significant differences in this area. The speechreading results indicated that there are benefits in having a strong base in a first language (GSL) while attempting to learn a second or majority language (Greek), even when access to the spoken/second language is extremely limited.

In addition, the DCDP group showed a strong correlation between expressive GSL and expressive written Greek. This suggested the benefits of a strong first language in fostering the development of literacy in the majority language.

Hatfield, Caccamise, and Siple (1978) investigated whether socio-linguistic background could be used to determine which deaf people are more proficient in American Sign Language (ASL), as compared to other English-based signed systems. Students from the National Technical Institute for the Deaf were assessed for competence in manually coded English (MCE) and ASL. Videotaped stories in both MCE and ASL were presented to 219

students, along with a socio-linguistic questionnaire and a true-false questionnaire in the same language as the story. Students in the "high" group typically had deaf parents and one or more deaf family members; learned to sign at age 3 or earlier; learned to sign from family members; attended a residential school; and used ASL as the primary means of communication. Those in the "medium" group were more likely to have hearing parents and one family member who was deaf; acquired sign language from friends between the ages of 5 and 10; attended a residential school; and used either ASL or sign/speech simultaneously. The "low" group had hearing parents; one or no deaf family members; learned sign at age 16 or later from friends or teachers; attended day classes or public school; and preferred the use of simultaneous communication or speech.

The researchers found those students in the "high" group had greater comprehension of both MCE and ASL, and fewer ASL errors, than either of the other groups. These findings suggested that ASL enhances, rather than impedes, the acquisition of English.

Moores et al. (1987) examined predictive factors in literacy development in DCDP and DCHP using total communication. Subjects were tested on an extensive battery examining the reading and writing of deaf adolescents. On all measures of reading and writing, DCDP outscored DCHP except on five subscores in the descriptive-narrative task. Since this was not a comparative study, the scores were not examined for significant differences. The data suggested that the use of a native sign language provides an advantage on tests designed in a majority culture language.

Harris (1976, 1978) investigated the effects of parental hearing status on impulse control in deaf children. He selected 324 subjects ranging in age from 6 to 11, based on the following criteria: onset of deafness prior to age 2, a hearing loss of 70dB or greater, and no additional handicaps. Each child was individually administered the Raven Coloured Progressive Matrices, the Matching Familiar Figures Test, and the Draw-A-Man-Time Test. In addition, questionnaires were sent to parents for information about parental hearing status, SES, communication mode(s) used in the home, and any additional relevant family information.

DCDP scored better than DCHP on all four measures of impulse control. Harris found that DCDP tended to reflect on their decisions before proceeding with an action, as opposed to DCHP, who tended to act quickly without careful consideration, thus accumulating more errors.

Other investigators have reported similar results (Balow and Brill 1972; Brasel and Quigley 1977; Stuckless and Birch 1966; Vernon and Koh 1971), suggesting that a strong early communication system and healthy acceptance of the child's deafness may well affect academic achievement, as well as other aspects of the deaf child's development.

The most recent comparison by Geers and Moog (1987) studied deaf students from oral programs and found these students to perform at a higher level than a demographic sample of deaf students. The research, conducted at the Central Institute for the Deaf (CID), included 49 boys and 59 girls representing 26 states in the United States, as well Quebec, British Columbia, and Ontario. The students ranged in age from 15:10 to 18:2 and had hearing losses of 85dB or greater and at least average intelligence. Aided audiological testing indicated that 62% of the students were able to receive an "intermediate amount of information (more than 20% but less than 70%), with an average AI (aided articulation index) of 43%." (p. 8) On a speech-reception task "46% were able to recognize some words in a closed set; however, their performance was inconsistent (i.e., 50%-89% correct)." Assessment of speechreading and audition combined revealed group averages of 57% correct through speechreading alone and 74% correct when audition was added. As well, 20% of the students understood more than 90% of the sentences presented in the combined condition.

Evaluation of a conversational sign-language interview indicated that 62% of the subjects were not familiar with sign language. "Of the remaining subjects who knew sign language 9% could communicate conversationally in signed English and 13% could do so in ASL." (p. 12)

The students were given a battery of tests to assess their reading, writing, and spoken language. Although the demographic data for 16-to-18-year-old deaf students in the United States report average reading levels of Grade 3 to Grade 4 (Schildroth and Karchmer 1986; Trybus and Karchmer 1977), the mean reading level for these subjects was Grade 8. As well, 30% read at or above the Grade 10 level, with only 15% scoring below the Grade 3 level. In writing, 75% of the students scored above 75% on an evaluation of their ability to produce syntactically correct structures at the sentence level. At the text level, 43% of the students' compositions "...were rated as good, very good or superior indicating good on-topic organization, a logical organization of ideas, minimal mechanical errors, and, for a few essays considerable imagination and originality." (p. 25)

Results of spoken-language assessment indicated that "these subjects have well developed language skills. Eighty-eight percent demonstrate proficiency with spoken language as measured by a Language Proficiency Interview, and their speech is highly intelligible....These subjects have verbal ability within the average range when compared to normal-hearing adolescents." (p. 41)

The students involved in Geers and Moog's (1987) study were specifically selected by the researchers and represented only a small percentage of the deaf-student population; that is, "socio-economic status of the families of these subjects was generally above average. Sixty-eight percent of the families had incomes above $35 000, putting these subjects in the middle- to upper-middle-class stratum. Sixty percent of the subjects had at least one parent who had completed college, and 75% of the families at least one parent who had attended college. All children had at least one parent who had graduated high school." (p. 32)

The results are therefore not surprising, given the amount of research indicating that SES is related to academic achievement (Brasel and Quigley 1977; Ogden 1979; Trybus 1980). Trybus identifies family income as probably second only to hearing level in its influence on the hearing-impaired child's level of reading comprehension (or other academic skill).

> Family income, we have found, is related to the type of school in which a hearing-impaired child is placed; to the ways in which the child uses a hearing aid, and the kind of aid it will be; to the likelihood that the deaf child has had the benefit of preschool experience; and to the rated intelligibility of the child's speech. Presumably because of all these relationships (and others similar), family income level has a significant relationship to reading achievement scores. The relationship between family income and reading achievement is almost exactly linear. (1980, p. 216)

As Geers and Moog note, "the data reported in this project should be of help in setting realistic expectations for children who are similar to the students in this sample." (1987, p. 42) The results cannot be generalized to the deaf school-age population at large, which is comprised of students from all socio-economic levels. As well, more than 30% of deaf students in the United States (Moores 1987) are members of unemployed and/or underemployed minority groups traditionally overrepresented in the lower socio-economic strata, including Black, 18%; Hispanic, 10%; Deaf, 5-10%; and Native American, 1%.

The results of the studies reviewed in this chapter are significant when the advantages of children with hearing parents are considered. The SES backgrounds of hearing parents are superior to those of deaf parents (Moores 1987; Rodda and Grove 1987). "In fact, to be deaf is to place one at considerable risk of being socially and economically disadvantaged." (Rodda and Grove 1987, p. 84)

Although early intervention programs have increased appreciably during the past two decades, at the time when much of the seminal research was conducted, deaf children of hearing parents more frequently received preschool training and individual tutoring (Moores 1987). In Meadow's (1968) study, 82% of the deaf children with hearing parents were enrolled in preschools, as compared to 40% of the deaf children with deaf parents.

Nevertheless, the evidence indicates the superiority of deaf children of deaf parents in language, academic achievement, and social development. The weight of the findings support a consideration of native sign language as a means to acquisition of the majority language for those deaf children of hearing parents who, to date, have not attained levels of majority-language development or academic achievement commensurate with their potential.

III - ACQUISITION OF BASIC NATIVE STRUCTURES BY DEAF CHILDREN OF DEAF PARENTS

Similarities in the language-acquisition process of deaf children of deaf parents (DCDP) and hearing children have been shown in studies of language imitation. Hoffmeister, Moores, and Ellenberger (1975) reported that the imitations of signed sentences by deaf children are characterized by simplification or restructuring when the sentences are beyond the children's linguistic capacities, a characteristic which has also been observed in hearing children (cf. Slobin and Welsh 1973).

Studies of DCDP learning American Sign Language (ASL) indicate that the language-acquisition process for DCDP corresponds to the way hearing children learn spoken language, with regard to progression through the developmental stages (Ashbrook 1977; Bellugi and Klima 1972, 1979; Boyes-Braem 1973; Collins-Ahlgren 1975; Hoffmeister 1978a, 1978b, 1978c; Kantor 1982; Lacy 1972a, 1972b; McIntire 1977; Meier 1981, 1982; Newport and Meier 1985; Wilbur and Jones 1974). Similar findings have been obtained in France (Rondal 1978; Rondal and Bredart 1982) and Italy (Caselli, Ossella, and Volterra 1983).

The acquisition studies demonstrate that native sign languages are, in fact, rule-governed, true languages with similarities to each other and to spoken languages and that they are acquired in a natural developmental sequence. Thus, the studies described in this chapter further support the position that it was the language used by DCDP that facilitated their superior cognitive, academic and psychological development in the comparison studies with deaf children of hearing parents (DCHP).

Semantic Acquisition

Bellugi and Klima (1972), Ashbrook (1977), and Hoffmeister (1978a) reported that the full range of semantic relations expressed by DCDP using ASL are the same relations used by hearing children. These findings were supported by Petitto and Charron (1987) in their study of the acquisition of ASL by one DCDP and the acquisition of LSQ (Langue des Signes Quebecois) by deaf twin DCDP. The children were videotaped monthly from ages 9 to 30 months, and their comprehension and production of signs were studied using specific tasks. A summary of their findings is as follows: 1) Deaf children acquiring the two sign languages had very similar vocabularies; differences between sign languages did not matter. 2) Deaf children's vocabularies were similar to hearing children's, and they occurred on a similar time-course (no age and rate advantage, no effect of iconicity/transparency). 3) There was a striking distinction between gestures and signs/words right from the start; deaf and hearing children's sign/word use did not cross the bounds of different sign/word types, although gestures routinely did (p. 8).

Ellenberger and Stayaert (1978) further studied semantic development in their investigation of the representation of action by children from 3:7 to 5:11. They found the following developmental trends: 1) a decrease in the use of pantomime/gesture in signs to

indicate action; 2) an increase in the use of abstract symbols and a decrease in the use of iconic re-enactment of events; 3) a shift from the role of actor to narrator in retelling stories; 4) the development of the ability to establish referents in space that could be incorporated into the action sign; and 5) an increase in the use of signs that incorporate information about participants in the action.

The first sign appears in deaf children's language two to three months earlier than the hearing child's first spoken word (Boyes-Braem 1973; McIntire 1974, 1977; Wilbur and Jones 1974). Hearing children of deaf parents (HCDP) may also produce the first sign several months prior to the same child's spoken words. It is interesting to note that the emergence of the spoken word in HCDP appears to complement the sign vocabulary with minimal overlap of signed and spoken words (Wilbur and Jones 1974). It is apparent that the two vocabularies are separate since the hearing child did not learn spoken words that correspond to the sign and vice versa, at least not initially.

In another study Schlesinger (1978) reported the emergence of first signs at 12 months with earlier attempts at sign production at approximately 10 months. Bonvillian, Orlansky, and Novack (1983) also support the evidence related to accelerated rate of development, although wide variation in development rate occurs during the first two years. Increase in development was established for production in Bonvillian's study, but not for comprehension.

Caution must be exercised when discussing the appearance of first signs. There is considerable difficulty in determining the emergence of the first word/sign. What is intelligible to parents who are familiar with the child may not be considered intelligible by an outside observer. Since the database is small, considerably more documentation needs to be established. However, it is possible that the earlier emergence of signs is due to the greater control of hand and arm muscles versus breath, tongue, and oral cavity muscles.

Another comparison of young deaf children with hearing children is in the size of the vocabulary. At 10 months a DCDP has been reported to use twenty signs (McIntire 1974). Hearing children at 10 months are just beginning to form their first words. The occurrence of two-sign utterances are also reported by McIntire for the 10-month-old deaf child. Two-word utterances appear at approximately 14 to 18 months for the hearing child.

Schlesinger and Meadow (1972) followed the progress of one child with deaf parents from the age of 8 months to 22 months. At nineteen months, this child had a sign vocabulary of 100 words, at the age when most hearing children have a spoken vocabulary of around 50 words (Lenneberg 1967).

In addition to the previous conclusions that the development of semantic relations are parallel in ASL and spoken-language acquisition, Ashbrook (1977) found that no difference in expression type existed between ASL and spoken languages. In her experiments, she examined relations expressed through a sequence of signs (as one would do through a sequence of spoken words) as well as relations expressed simultaneously within a complex

sign (e.g., agent expressed by verb agreement with that referent point in space, thus one sign starting at that point indicating both agent and action). She concluded that both expressions are possible in children's language as well as adult language. These studies of semantic acquisition demonstrate that there is no language or cognitive delay inherent in the learning of sign as the first language.

Syntactic Acquisition

Studies investigating the syntactic acquisition of ASL indicate parallels between the acquistion of certain syntactic structures in English and native sign languages. Lacy (1972a, 1972b) and Ellenberger, Moores, and Hoffmeister (1975) reported on the beginning stages of the development of negation by DCDP. Two forms, the negative headshake and the sign NO (which appears to be derived from the fingerspelled N-O) are reported to be the initial indicators of negation (Lacy 1972b). The negative headshake can occur simultaneously with the negative sign formed by the hand, and DCDP appear to produce both the negatives, either in linear order or simultaneously within the signed sequence. In later development the use of NO decreases, and the signs for NOT and CAN'T emerge within sentences. Parallel to the acquisition of negatives in English, the negative CAN'T emerges in sign prior to the positive CAN.

A comparative study by Deuchar (1987) indicated that the process of negative incorporation is similar in ASL, French Sign Language and British Sign Language.

Recent research indicates that ASL has a set of elaborate morphological processes which take advantage of the visual-spatial nature of the language (Klima and Bellugi 1979; Newport and T. Supalla 1980; Wilbur 1979). Morphological processes in ASL are said to be similar to the morphology of certain spoken languages, such as Serbo-Croatian, which are highly inflected (Meier 1981, 1982).

Word order is of importance in the acquisition of ASL. In the initial reports on word order, Fischer (1973) found that the basic Subject-Verb (S-V), Verb-Object (V-O), and Subject-Verb-Object (S-V-O) orderings were used even when the children used verbs capable of inflection. Support for the use of the basic S-V-O ordering in early sign development is provided by Hoffmeister (1978b) in his study of word order used by three DCDP. Basic S-V-O, S-V, and V-O orderings dominated the children's early patterning, even when the children inflected verbs for subject or object or both. This research was further supported by S. Supalla (1986). The strategy of using invariant word order is similar to that found in acquisition of languages where inflectional processes may be used to provide varying word orders. However, word order may also be used in ASL in certain instances for marking sentential relationships.

Thus, the more invariant word order of English sentences is not foreign to the child acquiring ASL, and the developmental sequence is not unlike that of the hearing child learning a highly inflected language, such as Serbo-Croatian. This aspect of ASL acquisition

and its influence on the acquisition of a language with a fixed word order, such as English, deserves further investigation and provides intriguing possibilities for a bilingual approach.

Acquisition of Phonology

Investigations describing the acquisition of phonological units in ASL have been limited primarily to the interaction of distinctive features and context in the acquisition of handshape. A model based on the anatomical considerations of the hands and their motor-development sequence was suggested by Boyes-Braem (1973). Handshapes are considered to be either unmarked (base handshapes) or marked (features were added to the base handshape). For example, the handshape A is considered to be unmarked; variations of this handshape are described in terms of extended fingers, opposed thumbs, or contact with the thumbs.

The interaction of distinctive features and context has been shown to be of critical importance in acquiring a spoken language. In acquiring rules of phonemic production, hearing children develop strategies that aid them in this process. For example, children may not be able to produce the same phoneme in all possible contexts, but they are able to produce the same phoneme in isolation or within certain contexts (i.e., initial versus final consonants) (Ingram 1974, 1976). Distinctions relevant to spoken language are also relevant to manual languages. Handshapes may be modified, depending on the environment in which they occur (i.e., movement, location, and orientation may be adjusted). For example, a child who can produce the sign for EAT ("O" handshape and motion toward the mouth) may not be able to produce the same handshape in the sign BUY because of the difference in contact (palm of the other hand) and in motion (outward movement).

Two Italian DCDP were observed longitudinally, Vanessa from age 1:3 to 2:3, and Massimo from age 2:4 to 4:5 (Caselli, Ossella, and Volterra 1983). The authors pointed out that the situation for deaf adults is different in Italy from that in many countries. Deaf parents have been educated orally and have been made to feel that signing will prevent their children from learning oral language. Therefore, they tend to use the vocal modality instead of signing to their children. However, the parents of Vanessa and Massimo, after some encouragement, agreed to sign to their children. As well, the children received oral input from hearing grandparents and were enrolled half-days in an oral nursery school. They were fitted with hearing aids and received acoustic and speech training twice weekly.

The authors reached the following conclusions: 1) There is a temporal lag between signed- and spoken-language acquisition; spoken-language learning proceeds more slowly than sign-language learning. 2) Vocal-language learning relies on prior sign-language acquisition, using it as a necessary support. 3) Bimodal acquisition in deaf children is, of course, different from bimodal acquisition of hearing children of hearing parents (p. 127).

Finally, they stated, "In conclusion, our results from the linguistic study show beyond a doubt that sign-language acquisition, from birth on, does not prevent deaf children from learning vocal language." (p. 128)

Iconicity

The finding from Petitto and Charron (1987) that the deaf children in their study experienced no advantage from iconicity or transparency in their acquisition process, was also reported by Meier (1982). The sign-acquisition sequence of deaf children is not determined by highly iconic mechanisms, such as analogies between the directional movement of certain verbs and the event being described; rather, the acquisition sequence is based on morphological principles found in languages in general. In addition to showing that sign-language acquisition parallels that of hearing children, the Meier and the Petitto and Charron studies serve to refute the argument that deaf children should not use sign language because its iconic and concrete nature would prohibit the emergence of abstract thought (Rondal, Henrot, and Charlier 1986).

In numerous reports for both spoken and signed languages, the late acquisition of inflectional morphology has been an intriguing question, particularly in the case of a sign language where morphological properties within the verb complex have underlying iconic information. The iconicity of signs has led some researchers to conclude that some signs may be analogous in their representation to the real world. This analogue property suggests that signs consist of continuous-movement frames and not discrete categories of morphology. Newport and Supalla (1980) suggest that the movement properties of certain sign categories (classifiers), consist of discrete elements. The discrete elements of movement are classified as "mimetic depiction". Mimetic signs (movement parameters) are typically associated with classifier handshapes. The acquisition of mimetic signs appears to follow that found for the acquisition of complex morphology in spoken languages.

Classifiers

"ASL has a fairly large set of signs that are called classifiers. Linguists have found that there are at least two types of classifiers: (a) classifiers in which a particular handshape (with a particular palm orientation) is used to represent a noun and can indicate the location of that noun and its actions, if any; and (b) classifiers that illustrate certain physical features of a noun as well as indicate its location in space." (Baker and Cokely 1980, p. 287)

Classifiers are linguistically complex, and require syntactic, semantic, and phonological information for appropriate choice and function. The relation between linguistic complexity and case/order/age of acquisition indicates that classifiers would take longer to acquire than other signs. It is also likely that classifiers require different strategies for acquisition than other signs, due to the complex interaction of phonological, syntactic, and semantic components of their proper use.

Kantor (1980) investigated the developmental stages in deaf children's acquisition of classifier forms. She drew the following conclusions based on the types of errors the children made, their relative performance on three different tasks, and their changes in ability over time: 1) The late acquisition of classifiers confirms the conclusions of Kegl (1976a, 1976b)

and Kegl and Wilbur (1976) that classifiers are a complex system. 2) Classifiers are not acquired as lexical items per se but rather as complex syntactic processes; this is documented by the use of appropriate classifiers in some environments and not in others. 3) Classifiers appear at the age of 3; but they are not completely mastered as a set of rules until 8 or 9 years of age. 4) The deaf child's acquisition of segments is not simply a matter of incremental ability to control the weaker digits of the hand; rather, it is a complex interaction of the various components of the language. 5) There is an influence of syntactic and phonological environments operating on the acquisition of rules in ASL, similar to the effect of environment on spoken-language rule acquisition as described by Menyuk (1987). 6) The notion of function as described by Ingram (1976) is applicable to the acquisition of segments in ASL. 7) The domain of application for a rule widens as the child matures in much the same way as it does in hearing children as described by Menyuk (1987). 8) The earliest handshapes used in initial use of classifiers correspond to the stages of development suggested by Boyes-Braem (1973) and McIntire (1977). 9) The order of feature acquisition corresponds to the hierarchy suggested by Wilbur and Jones (1974), with the addition of orientation.

Hoffmeister (1977, 1978a) identified various functions that pointing serves in adult ASL, such as the demonstrative pronoun as part of the possessive system (with the B hand) as a reflexive (with the A hand), and as an indicator of plural and specific reference. In this study, Hoffmeister referred to the pointing gesture as POINT. He noted that the POINT forms the basis for several developmental stages in ASL acquisition. He found that the early two-sign productions consist of two POINTS, as in "Let's you and I go downstairs," signed as POINT (to addressee) POINT (to self) POINT (down). Subsequent developments in the three-sign stage included one sign and two POINTs, two signs and one POINT, and finally three non-POINT signs. Hoffmeister concluded that POINT is part of the developmental sequence of ASL and that the child learning ASL uses pointing gestures in a manner which is linguistically constrained and functional, unlike a hearing child's pointing gestures. Agreement points can be established in space for reference to non-present objects and persons; these represent a greater linguistic abstraction than pointing to visibly present objects (see Wilbur 1979). Hoffmeister found a developmental sequence that suggested the concrete POINT was acquired earlier than the abstract POINT.

The significance of Hoffmeister's study on the understanding of child language is demonstrable. Wilbur and Jones (1974) incorrectly concluded that sequences of a noun sign followed by, or preceded by a pointing gesture occurred because children lacked the linguistic ability to say what they wanted and chose to point instead. Locative POINTs were not separated from object reference POINTs in Wilbur and Jones' analysis and it was incorrectly assumed that POINTs did not count. In a re-analysis of the data, based on Hoffmeister's POINT notions, it was found that the earliest two-sign utterances were combinations of sign and POINT, and that such sequences occurred at least a month earlier than two non-POINT signs together.

Among non-signers, popular opinion views pointing as a fundamental gesture, so basic that its use in ASL was overlooked for a long time and, when it finally was recognized, treated as evidence that ASL was concrete and context-bound. Bellugi and Klima (1985) remarked that before beginning their study of the pronominal system, they had expected that the learning of pronominal reference in ASL would occur early and would be easy for the child. Their findings did not support this notion.

If pointing were as basic, iconic, and concrete as is commonly thought, there would be no developmental progression in its acquisition by young deaf children. As discussed previously, Hoffmeister reported a number of stages in the development of the proper use of pointing, as did Petitto (1987a, 1987b) in her study of early pointing behaviour.

These studies confirm that sign languages are not simple gestural systems that can be matched word for word with spoken language. They also demonstrate that the learning of sign languages provides the same kinds of cognitive stimulation and requires the same levels of problem solving as the learning of spoken languages, again disputing the idea that sign languages are cognitively impoverished and concrete and thus detrimental to the cognitive processes of the children acquiring them.

Use of Space

When a construction has both a central and a secondary object, they are located in some kind of relationship with respect to each other (i.e., in, on, under, over, next to, above, in front of, or behind the other). These relationships form part of what T. Supalla (1982) called the "base grid system", the arrangement of objects in space. The acquisition of the spatial grid is another part of the acquisition of the overall use of space for linguistic purposes in ASL. Schick and Wilbur (1985) observed that children may have difficulty maintaining the proper grid when they break a complex predicate into smaller sequential predicates.

The relationships among objects themselves are also acquired in sequence. Schick and Wilbur (1985) reported that "on" was acquired before "back", which was acquired before "between". This order parallels that given by Johnston and Slobin (1979) for children learning locatives in Italian, Serbo-Croatian, Turkish, and English. Schick (1985) also reported that complex predicates with moving verbs were acquired earlier than those with stative verbs. She speculated that a moving figure in the figure/ ground relationship makes the objects more salient to the children than in non-moving situations.

"The use of space gives a sign system different dimensions and may enable an individual to communicate complex linguistic relationships in a relatively simple way. In other words, if we assume the primacy of cognition over language, a signed language can convey concepts that in spoken American English would be acquired only at a relatively late age." (Moores 1987, p. 206)

The few studies that trace the acquisition of native sign language by deaf children of hearing parents show that the child's vocalizing does not decrease when sign language is introduced. As well, the authors of these studies indicate that children may fade signs and use speech when a sign is not known or when they have not yet mastered the equivalent sign process.

The weight of this research shows that deaf children of deaf parents and deaf children of hearing parents have the potential to learn native sign language easily and naturally when sufficient exposure is provided. Hoffmeister and Wilbur (1980) conclude that "...language when presented in a visual mode can be acquired easily and in the same quantity and quality as language presented in an oral-aural mode." (p. 75)

IV - STUDIES OF MOTHER-CHILD INTERACTION

This chapter examines the research on mother-child interaction for deaf children of deaf parents (DCDP) and deaf children of hearing parents (DCHP), and compares the findings to characteristic patterns of interaction for hearing children with hearing parents. Mothers in each group use what are called "Baby Talk" registers when communicating with their children.

The literature on Baby Talk indicates that it is markedly different from the language used with adults. Ferguson (1977) identifies three processes associated with the language directed to children: 1) simplified processes; 2) clarifying processes; and 3) expressive and identifying processes. The literature also suggests that eye gaze, gestures, and turn-taking behaviour are incorporated in early interactions. In addition, the mother's conversation is initially limited to the "here and now", focusing on individuals and objects that are present in the environment. These features are also used by other adults and children who interact with the child.

Deaf Children and Deaf Mothers

As demonstrated in the research reviewed below, deaf mothers of deaf children and hearing mothers of hearing children use Baby Talk to provide similar linguistic environments; however, deaf mothers tend to use both manual and oral forms of communication. Other processes are maintained by both sets of mothers.

Maestas y Moores (1980) conducted a study of three deaf mothers with infants aged 1 to 6 months. They were videotaped in their homes at one-month intervals, on at least six occasions, under the conditions of bathing, feeding, or playing. The videotapes were analysed for communication modes, pragmatic functions, and interactions between the two, as well as similarities that might exist among the mothers.

The findings were that the deaf mothers used the same linguistic features as hearing mothers with their infants, as described in the literature. Communication modes varied according to the type of interaction required, with vocal, manual, or a combination of modes being used. As with hearing mothers, the deaf mothers adjusted their input to accommodate the infant's abilities. Moores also found one child, 24 days old, who synchronized finger movements in relation to the mother's signs. (Papousek and Papousek 1977, found that the hand movements of 2-week-old hearing infants were responded to by parents as though they were communicative.)

Kantor (1982) investigated the communicative interaction between two deaf mothers and their deaf children, aged 12 to 20 months. Subjects were videotaped in the home for one-hour periods during play and feeding times. A total of 28 sessions was recorded and transcribed. Kantor found that both mothers used the strategy of talking about objects that were present when first words appeared, and that this behaviour diminished over time and

was replaced by POINTs to objects and the citation forms of verbs. There was a gradual progression to verb modulation, which increased in complexity. Both mothers limited their language productions to equal their child's receptive linguistic abilities, again paralleling hearing mother-child interactions.

Deaf Children and Hearing Mothers

"The disadvantaged group traditionally has been deaf children of hearing parents. They do not benefit from the presence of a simple and clear communication process." (Moores 1987, p. 197)

Greenberg (1980) examined communication modes used by 28 hearing mothers and their deaf children, ages 3:0 to 5:6. Subjects were divided into two groups: families which used oral communication exclusively and those who used a combination of signed English and speech. The sample was further divided into levels of communicative competence within each method. Each mother-child dyad was observed in a laboratory situation during two periods: a five-minute instructional task and a fifteen-minute play-and-separation period. Greenberg found that duration and complexity of interactions between mother and child were affected by the mode of communication. Mothers and their orally trained children had shorter and less complex interactions than mothers and children who used signed English and speech combined. In addition, mothers achieved less co-operation from their orally trained children than mothers who used simultaneous communication. Greenberg noted that positive mother-child interaction is important in the relationship between social interaction and more sophisticated communication.

Greenberg (1983) also conducted a study with deaf preschoolers (ages 3:0 to 5:6), dividing them by mode of communication. Twenty-eight mother-child dyads were observed during free-play activities and instructional tasks for a total of twenty minutes and were assessed for communicative competence, functional communication areas, and social interaction. Results showed that simultaneous communication dyads had higher levels of communicative competence than oral dyads. Simultaneous children had a higher rate of spontaneous utterances, showed more positive social behaviours, and exhibited more complex utterances. For those in the high-communication group, simultaneous dyads scored higher than oral dyads on all measures, except total amount of communication time. In the low-communication group, simultaneous dyads outscored oral dyads in all areas.

Swisher (1984) examined the simultaneous communication (spoken English and a signed-English system) of hearing mothers with their deaf children. Six mothers who had been using simultaneous communication for at least two years were videotaped in their homes with their children, who were between 4:6 and 6 years old. It was found that the mothers deleted an average of 40.5% of the signs from their utterances. As the author pointed out, the mother must be aware of the differences existing between the two systems as well as her own signing behaviour. There is also variation in the urgency and complexity of the messages

mothers need to convey, and in mothers' ability to express concepts through a sign system which may be unfamiliar.

> One source of concern is that for the average mother the necessity of signing might in itself restrict communication by keeping her from attempting utterances. This might happen either because she did not know signs for all the words in the utterance or because a sentence might seem too long and cumbersome to encode. If the mother habitually communicates less, then the child will have not only incomplete utterances in the input data as we have seen, but also a reduced corpus to work from. (p. 81)

However, the unaddressed issue is that the child would likely receive incomplete messages as well if the utterances were produced in speech alone (Hoffmeister, in progress).

Schlesinger and Meadow (1972) observed mother-child interactions in 40 deaf children and 20 hearing children, ranging in age from 2:6 to 4 years. They found that the hearing mothers of the deaf children were, on the whole, more controlling, more intrusive, more rigid, and more critical. They also reported that 75% of the orally trained deaf children in their study had a mean language age that was more than one year lower than their chronological age (mean chronological age, 3:8; mean language age, 2:4). However, where positive, natural communication existed, there was no significant difference between deaf children of hearing parents and hearing children of hearing parents. This study showed that communication was the key to psycho-social/emotional development of the child.

Comparisons

Meadow, Greenberg, Erting, and Carmichael (1981) studied social interaction and communicative competence in four groups of mother-child dyads: deaf children with hearing mothers who used simultaneous communication; deaf children with hearing mothers who used oral communication; deaf children with deaf mothers; and hearing children with hearing mothers. Each dyad was videotaped during free play and eating. Results indicated a striking similarity between the deaf mothers-deaf children and hearing mothers-hearing children. Their interactions were "elaborate, complex, extended, and child-initiated." (p. 465) These children were able to talk about objects that were not present and about themselves and their mothers. In contrast, deaf children with hearing mothers "asked fewer questions, made fewer self-references and solicited choice responses, and showed more object references and imitations of their mothers....[They] were less likely both to communicate spontaneously and to respond to their mothers' queries." (pp. 462, 464)

The findings of these studies, coupled with the results of studies of gesture usage summarized previously, suggest a continuum of mother-child interaction for deaf children and their parents, based on the degree to which manual communication and gestures are used in communicative situations. The continuum moves from the interaction of the deaf parent and

deaf child, to that of a hearing parent using simultaneous communication with a deaf child, to that of a parent using oral language and gestures with a deaf child, to oral language use only.

> The primary challenge, then, is to help hearing parents establish effective communication with their deaf children as quickly as possible. It is indisputable that in a majority of cases this goal cannot be accomplished simply through reliance on exclusively oral-aural means of communication. Some educators have argued against the use of manual communication by hearing parents on the basis that American Sign Language is a complex system with a vocabulary and structure that has obvious differences from spoken English. The implication is that, because parents cannot completely master ASL in a very short period of time, they should not use any form of manual communication with their deaf child. There is no theoretical or practical reason to support such a position. In fact, the nature of Baby Talk registers and the special relationships between ASL and Signed English suggest that hearing parents can utilize manual communication as an effective tool almost immediately. (Moores 1987, p. 197)

V - EDUCATIONAL SIGNING ISSUES

Greenberg (1983) states that parents who have positive attitudes and are able to interact comfortably with their child will create an environment in which the deaf child will feel capable. This positive feeling will enhance play and exploration, which increases the child's interaction with the environment, thereby permitting the normal development of cognition. However, etiological factors and the amount of language input take on a significant role in cognition, as well. (It is not within the scope of this project to investigate the issue of children with handicapping conditions that affect cognition. Therefore, we will address the language issue only.)

When a child is diagnosed as deaf, the parents are under pressure to establish a system of communication as rapidly as possible. This chapter reviews the literature on options available to parents and examines research on issues related to signing for educational purposes.

The Oralist Position

One argument offered in support of an oral approach is that children should be exposed to oral language exclusively in order to avoid any inhibition in their use of speech by the opportunities to use sign. However, speech production and reception were not shown to be at risk in the studies reported earlier, and Dumont (1978) found that the use of sign language did not prevent his deaf subjects from learning spoken and written language.

Six of eight studies cited by Musselman, Lindsay, and Wilson (1988) as having mixed findings regarding the spoken language of signing children are known to have found equal spoken-language abilities for both groups of signing and oral children (cf. Moores 1987). Furthermore, in the Greenberg (1980) study cited by Musselman et al. as showing advantages for oral mothers and their children, Greenberg provided qualifications to his findings that were not reported by Musselman et al. In a personal correspondence, Greenberg indicated that the SES backgrounds of the oral mothers and children were much higher than the signing mothers and their children, and indicated that the results were influenced by this discrepancy.

There are problems associated with delaying the use of signs with deaf children for whom a visual language will ultimately be deemed necessary. Language, whether it be English or ASL (or other majority or native sign languages), must be established early in the child's life to provide the tools for the bonding process (Freeman, Carbin, and Boese 1981). This becomes particularly crucial when considering that 95% of the children born with a hearing loss are born to hearing parents. In addition,

> ...early exposure to a native sign language permits the normal brain-based maturational processes to proceed on schedule...[early signers] achieve all of the cognitive milestones on schedule as well.... Moreover, these children readily learn to spell and read the majority target spoken language....Importantly, these children typically show

> great success with oral language training because they have the full cognitive and linguistic foundation upon which to "map" the oral language training. That is, they can approach the task of learning spoken language...with the same cognitive/linguistic skills that a hearing child employs in a typical bilingual context. (Petitto, personal correspondence)

Preisler (1983) did a descriptive study of the communicative strategies used by fifteen deaf preschoolers in Sweden. All the parents of children in this study had been advised, upon diagnosis of deafness, to pursue oral-only training. Five of the parents did not take the advice and proceeded to offer their children early access to sign language. Videotapes were made along with direct observations once a month in a kindergarten for deaf and hearing children. The study was longitudinal, with individual children being followed for .5 to 2 years. Analysis revealed differences in the way the early signers (ES) and late signers (LS) communicated. ES paid attention to partners in dialogues and joint activities to a greater extent than did LS. ES modified their way of communicating to fit that of their communicative partners, while LS did not.

> The children with early sign language experience had all been brought up in an environment where communication had been easily accessible. The children were encouraged to take part. They were used to understanding what their parents told them and used to being understood....During infancy and childhood these children had learnt the rules of communication in social interaction. This knowledge was now reflected in the way these children interacted with other children. (p. 215)

This study thus shows a distinct advantage for the earlier signing children with regard to the rules of social interaction. It also shows that parents can successfully learn to communicate with their deaf children in Sign, even while still in the traditional grieving period over the discovery of their child's deafness.

Further studies have investigated the effects of oral training on children's communication in school. Several researchers have reported that in spite of strictly oral programs, children develop visual-gestural systems of communicating among themselves. Tervoort and Verberk (1967) reported that orally trained deaf children, when in the presence of other deaf children, used manual gestures in a relaxed and fluent manner that contrasted sharply with their communication attempts with hearing children.

Goldin-Meadow and Feldman (1975) studied four deaf children ranging in age from 14 months to 4 years. Each of these orally trained children had developed an idiosyncratic system of gestures. (These studies are somewhat reminiscent of a later section in which we examine the phenomenon of the incorporation of ASL features in the signing of children who do not have access to ASL.)

Simultaneous Communication Position

A visual language may not be necessary for those children for whom interference in receiving the spoken language is minimal. For children with more severe hearing losses, however, the learning and use of a sign language is generally accepted as the way to compensate for the interference resulting from the hearing loss (Jordan, Gustason, and Rosen 1979). In most countries this compensation has taken the form of Simultaneous Communication (SC) in the majority spoken language and an invented sign form of the majority spoken language.

The decision of professionals to combine a signed language with a spoken language resulted in the modification of the signed form in an attempt to represent the spoken form. Artificial systems (e.g., SE, SEE I, SEE II) were created for use in classrooms. These systems (which we will generically call sign English unless otherwise specified in the studies reported) were created in an attempt to represent morpheme units in English in a visual form. Linear inflectional forms were created as needed, and signs were chosen on the basis of sound, spelling, and meaning. The correspondence of these forms to English ranges from the use of basic ASL lexicon, as in SE (Bornstein, Hamilton, Saulnier, and Roy 1975) to a morpheme-by-morpheme match based on the oral production of English, as in SEE I (Anthony 1971) and to some extent in SEE II (Gustason, Pfetzing, and Zawolkow 1972).

> Of these systems, SEE I and SEE II are most widely used today in programs that ascribe to the Total Communication philosophy. Even more widely used, however, is a non-standardized approach, the simultaneous communication of Signed English that has developed through the efforts of teachers who later learned sign language and tried to use the two at the same time, in a "total" approach. This has meant that most deaf children in Total Communication programs are instructed in English in which the spoken portion is distorted by simultaneous signing, which is incomplete and inconsistent at best. (Lou 1988, p. 932) (Research supporting Lou's premise is presented in a subsequent section of this chapter).

Several studies have compared the performance of children trained in TC programs with those trained in oral programs. Twenty deaf high school students from the Arizona School for the Deaf and Blind scored significantly higher on reception of simultaneous communication (SC) than when presented with the Rochester Method (fingerspelling) or auditory-oral information (Klopping 1972), while the Rochester Method scores were significantly higher than the auditory-oral scores.

White and Stevenson (1975) tested the comprehension of 45 students from a TC school in Maryland and 36 students from an oral school in Michigan. Using manual communication only, SC, and oral language, they found that all the students, regardless of program, scored less than 50% on oral-only reception. Scores on manual-only communication and SC were higher. No significant differences were found between the manual-only

condition and the SC condition. The authors concluded, "...there is only meagre evidence indicating that subjects score significantly better when they receive a single oral presentation of subject matter than when they guess....From this finding it can be said that instructing average and bright deaf students using a pure oral method will result in the assimilation of significantly less information than they are capable of receiving." (p. 56)

Similar results were obtained by Montgomery and Lines (1976) and Moores, Weiss, and Goodwin (1978). Each study concluded that deaf children's comprehension increased when signs, speechreading, and fingerspelling were added to the oral-only input. As did Klopping's study (1972), these studies showed that the reception of signs was far superior to the reception of fingerspelling.

Lenning (1974, as reported in Preisler 1983) studied the communicative competence of oral and signing 5 year olds and found that the signing children could retell more information to a peer about two films they had viewed than the oral children could. It was also found that the signing children were better understood by their peers.

These studies of children have their counterparts in studies of deaf adults. Grove, O'Sullivan, and Rodda (1979) developed a test of communication which included 120 messages varying in difficulty from simple to complex semantic structures. The test was administered in the subjects' preferred communication mode to British deaf adults ranging from 16 to 21 years of age. All subjects scored significantly higher when the messages were presented in SC than when they were presented orally. This difference was obtained for the simplest to the most complex structures.

Increased comprehension with simultaneous communication was also found by Caccamise and Blaisdell (1977) and Johnson (1976) with students from the National Technical Institute for the Deaf.

The studies described above demonstrated the efficacy of a signed form over oral-only education for deaf children and provided the necessary support to implant the TC "philosophy" or "methodology" firmly in schools and programs for deaf students all over the world. By 1979 almost 90% of the schools and programs for the deaf in the United States were reported to use some form of visual communication in the classroom (Jordan, Gustason, and Rosen 1979).

Because the deaf child finally had access to a great deal more of the semantics necessary to make sense of the information presented, it was believed that the young deaf child had become more proficient in English. This conclusion may not be entirely accurate. While deaf children in TC programs now have access to a tremendous amount of content not previously available, they are still not exposed to a consistent, sophisticated language that would challenge them to abstract higher levels of language (Johnson, Liddell, and Erting 1989). "Although manually coded English has largely replaced oralism as the most common

means of educating deaf students, it is no more successful than oralism at turning the average deaf child into a native or near-native speaker (or signer) of English." (Rudser 1988, p. 106)

Nevertheless, the Total Communication movement has probably served as a necessary bridge, facilitating the transition from the oralist position of several decades ago to the current climate in which consideration is being given to the use of native sign language in the classroom.

Efficacy of Simultaneous Communication

A number of researchers have called into question the efficacy of simultaneous communication.

Spoken languages, such as English, depend on the order of lexical items to demonstrate the role of nouns in sentences. They do not share the rich morphology of a native sign language, such as ASL. Although English may have some morpho-syntactic properties (i.e., inflections on verbs and some derivational rules), in general, the language has separate words and markers to indicate its sentential roles. English depends on the use of a linear auditory stream of sound, while ASL depends on a sequential stream of visual relationships, shapes, and movements.

The concept that ASL and spoken English are on the same continuum of language form and use appears to be incorrect (Stokoe 1970; Woodward 1972). Instead, it is more appropriate that the continuum show a sign language at one extreme and the artificial systems at the other extreme (Reagan 1986; Wilbur 1987).

Questions regarding the efficacy of using a sign language based on a spoken language have been raised in some European countries as well. For example, Danish teachers of the deaf have chosen not to modify the manual system according to spoken Danish for use in the schools (Hansen 1975). However, a combination of spoken Danish and a manually coded form of Danish (parallel to sign English) may be used in conversation, depending on the fluency of the signer and the hearing status of the signer/speaker.

Hansen (1975), in an effort to determine the feasibility of modifying Danish Sign Language to conform to spoken Danish, initiated a project aimed at answering the following question: Why is it easier for a deaf person to simultaneously produce signs and speech than for a hearing person to do so? The results of this project suggest that knowledge of the rules associated with the visual modality (i.e., location, redundancy, use of spatial memory, and spatial recall) appear to help the deaf person produce the appropriate information manually while also producing the same information vocally. Hansen concluded hearing persons who attempt this simultaneous presentation are not understood by the average deaf person because they do not produce the important syntactic details in the visual mode.

These results, as well as the findings of Hansen's (1980) study of SC, have profound implications for hearing parents and teachers who are not aware of the visual mechanisms. Hansen (1980) concluded,

> ...we studied simultaneous communication and found that intonation and rhythm in the spoken language were often ignored by the interpreter or the hearing signer when signing and speaking at the same time. Intonation and rhythm are important parts of a message in spoken language--so important that some linguists have said that about 30% of our understanding of speech is based upon this information. What was new for us was this "visual intonation" in Sign Language. This visual intonation was made in different ways but had the same function: Among other things, to separate utterances and to stress important messages and signs. To watch a person signing without this visual intonation must be like watching a kind of written language performed in the air without any periods, commas, dashes, or semicolons, and without any clues about what is important, because most of the signs are performed with the same intensity. (p. 254)

In discussing the language acquisition process from the Danish perspective, Hansen notes that deaf children who are exposed to signed Danish do not learn Danish or Danish Sign Language. She therefore considers them to be "half-lingual". It is important to note, however, that what the children developed was linguistically creative and corresponded in some ways to the sign language used by deaf adults. Hearing teachers and parents had difficulty understanding this form of sign language and therefore had trouble communicating with the children.

Bergman (1977), in discussing the use of signed Swedish, stated that persons interested in efficient communication must be taught more than the surface match between a signed form and the spoken Swedish form. In order to communicate, both producer and receiver must know and understand the language (whether it be manual or vocal). Hence, parents in Sweden are taught signed Swedish and principles of Swedish Sign Language.

Johnson, Liddell, and Erting (1989) discuss the fact that people refer to the modification of a visual language combined with speech as "sign language." (p. 5) They argue that this combination is not a sign language because sign languages are the result of a natural developmental process. The artificially created sign systems did not develop naturally. The authors list three factors from research on native sign languages that demonstrate the requirements of a natural sign language: 1) sign languages develop naturally over time among a community of users; 2) sign languages are acquired through an ordinary course of language acquisition by children exposed to them; 3) sign languages are grammatically organized according to principles found in all other human languages. These researchers suggest that Sign Supported Speech (their term for artificially developed sign forms used simultaneously with speech) does not share these characteristics.

Production and Reception of Simultaneous Communication

Johnson, Liddell, and Erting (1989) argue that producing sign-supported speech (SSS) is a cumbersome task for teachers and deaf children alike.

A number of studies have demonstrated that teachers either modify the signed forms to represent semantically appropriate ASL forms (Kluwin 1981) or (more typically) delete significant portions of the signed forms necessary to match spoken English (Baker 1979; Crandall 1978; Marmor and Petitto 1979). (It will be recalled that Swisher [1984] obtained the same finding for mothers of deaf children using simultaneous communication.) The result is a deterioration of the signed presentation to deaf children. Johnson and Erting (in press) examined the SSS of a preschool hearing teacher interacting with a four-year-old child. A random segment of their transcript indicated that the teacher misarticulated signs, often inadvertently producing signs that actually had a different meaning from the intended sign, as for example, DEVIL and HORSE signed for RABBIT, CAN'T signed for CAN, and FREEZE signed for WANT. More problematic was that many of her English words were not represented by signs, and there was no consistent pattern as to which signs would be eliminated. Thus, the signed sentences were mostly incomprehensible, often contradictory to the message, and largely incomplete. Ewoldt and Saulnier (in progress a) have obtained the same findings and conclude that it is unrealistic to expect children with little or no hearing and little prior contact with English to learn English from this kind of model.

Luetke-Stahlman (1988) reports that half her sample of 12 hearing teachers were able to "convey spoken meaning 86% or more of the time via the signed portion of their utterances using SEE2, while one signed-English signer was able to semantically encode 78% of what she said in sign." (p. 234) The range of adherence to the rules of simultaneous communication was from 53% to 89% for SEE2 users and 38% to 78% for sign English users. Luetke-Stahlman stated that these teachers were considered to be better-than-average signers.

Hoffmeister (in progress) indicates these results, although presented in a positive light by Luetke-Stahlman, have tremendous negative ramifications; one must question the effect on the learning of deaf children when only a portion of the correct message is presented at any given time and then, only by half of the better-than-average teachers.

Comparison of deaf and hearing teachers contributes to an understanding that the more discrete syntactic and pragmatic features of sign language suffer in attempts at simultaneous communication.

A study by Mather (1987) compared the booksharing behaviours of a preschool deaf teacher and a hearing teacher. She found that the hearing teacher used inappropriate eye gaze and inappropriate non-manual grammatical signals to mark the intended meaning.

In an additional study Mather (in press) described the presentation of a story by a deaf teacher and a hearing teacher to a preschool class. Some of the differences between the teachers were the following: 1) The deaf teacher used classifier predicates, a feature of ASL, to adapt her signing to the pictorial context provided by the book. 2) The deaf teacher adapted the size of her signs, making them smaller so that the children could see the book and the signing at the same time. 3) The deaf teacher chose signs on the basis of the meaning of the text, while the hearing teacher tended to sign more literally. 4) The deaf teacher incorporated the sounds of words into signs (e.g., mouthing "meow", while signing CRY, while the hearing teacher signed and voiced the more literal meaning of the word cry).

Mather makes the point that deaf teachers have traditionally been placed in classrooms with older or lower-achieving deaf students. Hearing teachers who are also less competent signers have been placed in preschool classrooms. Mather suggests that the placement of deaf (and proficient hearing) signers in preschool classes would seem to be appropriate, given the minimal language of many deaf preschoolers from hearing families. She also points out that children who have already acquired a language prior to school entry, equally need literacy demonstrations in a complete language which is meaning-based.

In studies of the deaf child's learning of English through the invented sign systems, a number of contradictory results have been published. Some of these studies suggest that the young deaf child is capable of learning both the content forms of English (nouns and verbs) and much of the non-content or inflectional properties of the language (Bornstein, Saulnier, and Hamilton 1980; Gilman, Davis, and Raffin 1980; Luetke-Stahlman, in press), and that they can successfully segment Signed English sentences into words (Zorfass 1981). Some studies have found that the young deaf child exposed to SSS performed better academically (Babb 1979) and on tests of English structure, such as the Test of Syntactic Abilities (Gustason 1981).

Bornstein and Saulnier (1981) found, however, that initial learning of the inflectional morphemes of English is not maintained among older deaf children. This finding was further substantiated by Gaustad (1986), who discovered that the young deaf child's signing is lacking in full representation of English.

To determine when morphemes come in for deaf children exposed to sign English, Maxwell (1987) analysed the language of two deaf children and found that their understanding of the rules governing bound morphemes was still vague, at best, at age 3. From the first appearance of these morphemes, there were mistakes in production (i.e., 's, appearing as every other sign in a "Humpty Dumpty" recitation), and although improvements were noted, there was still a tendency for these forms to be deleted and, at times, used incorrectly. The most successful morpheme developed was the regular past tense (marked with -d in signed English). Success with this form was thought to be due to an already present past-tense marker in ASL, which functions in a similar manner.

Maxwell concluded that the children's signing of the morphemes in haphazard and inappropriate locations was related to the way signs were demonstrated, particularly in the school setting. These morphemes are unaccented in English and often slurred in their spoken presentation. Educators and parents, in trying to help the deaf child attend to these cues, were accenting them. The resulting high perceptual salience and distortions in prosody made the morphemes appear as free and somewhat meaningless signs spread throughout conversations. Mistakes in the signing of morphemes by both children were particularly noted in recitation, and deletions were often noted in conversations. Of the morphemes studied, -ing and -s were the most difficult for the children, probably because of the additional wrist movement, which makes them appear more like independent signs.

Researchers in Denmark and Sweden have also attempted to investigate issues related to both the model used by the adult and the process of acquiring this model by the young deaf child. Preisler (1981) suggested that one should focus on principles of bilingualism in spoken languages to determine knowledge of a sign language. Mason (1988) has speculated that the acquisition of bimodal bilingualism is similar to the acquisition of bilingualism with two spoken languages.

Some research studies have investigated the comprehension of information by deaf students when the message is presented in simultaneous communication as opposed to ASL or spoken English. In a study by Morariu and Bruning (1984) 30 deaf high school students were shown passages in sign English and ASL, as well as written versions of English and ASL. (Although ASL does not have a written form, the authors claimed that much of the grammar and syntax of ASL can be conveyed through print using English words. This is, in our opinion, a major fallacy.) Subjects were asked to recall passages from each of the four modes, and their recall protocols were subjected to propositional analysis. The number of propositions recalled was greater for the ASL passages than for the English passages. The authors concluded that "the continuous exposure to signed English in the educational setting does not necessarily facilitate the encoding or retrieval of meaningful propositions." (p. 162)

Murphy and Fleischer (1977) attempted to control for sign preference (ASL or sign English) in a study of the test performance of deaf students at the California State University, Northridge (CSUN). Twenty-nine CSUN students were divided into two groups made up of 16 students who preferred ASL and 13 students who preferred sign English. Half of each group received lectures in ASL, and half received lectures in sign English. There were no significant differences with regard to an individual's preference or performance, whether ASL or sign English was used. The authors concluded that this group of CSUN students was bilingual in ASL and English and therefore able to process both lectures.

Due to the impact of the TC movement, and recent research in this area, the use of a signed system by hearing parents of young deaf children has become more accepted (Hoffmeister and Shettle 1983). However, studies investigating the acquisition of a signed system by young deaf children of hearing parents are rare, due to the following factors: 1) the average age of diagnosis of a hearing loss is approximately 20 months (Freeman, Malkin, and

Hastings 1975); 2) parents are typically not encouraged to use a sign language initially with their deaf child; and 3) parents do not have extensive access to sign-language information. It has been only recently that hearing parents of young deaf children have been provided with appropriate information regarding the development of a sign language and how this might impact on their lives (Hoffmeister, Towne, and Szarek 1978).

Code Switching

Principles of code switching provide information about the knowledge of one sign system versus another. In order to switch code, one must also be aware of which code is appropriate for the context of situation, and one must have a perspective of the receiver's capability in both languages.

Preisler (1981) investigated the language of a 4-year-old deaf girl of hearing parents who was exposed to both signed Swedish (SS) and Swedish Sign Language (SSL). Sara was capable of modifying her signing, depending on the receiver. With hearing adults Sara signed "slowly and with distinct hand movements as well as articulating every single word." (p. 412) When communicating with an infant, even more adjustments were noted. Her communication with a peer, who was also a competent signer, was different. Together, their interaction was "vivid", and "the meaning of the verbal utterances was enhanced by the use of mimicry, pantomime, gestures, and body postures." (p. 412) This peer communication was effortless, and there were very few misunderstandings, in comparison to the problems in communication experienced with the hearing adults.

In another study involving code switching, Erting (1980) described a preschool classroom in which half of the eight children had deaf parents and were learning ASL naturally at home. The class had a hearing teacher and a deaf aide. Erting reported that the signing of the children and the aide changed from a more ASL-like signing to signing that was more like English during refreshment time. One of the deaf children of deaf parents seemed to use his voice more (and sometimes dropped his signs altogether) when interacting with the hearing teacher in structured situations, a style he never adopted with the deaf aide. In addition, the deaf children engaged in conversation with the deaf aide had more instances of turn-taking and longer conversations than with the hearing teacher.

Uses of Sign by Hearing Parents

The primary argument in favour of Simultaneous Communication is that it is not realistic to expect that hearing parents (who make up the largest percentage of parents with deaf children) will learn the native sign language. However, the research presented here suggests it is unrealistic for the deaf child to be expected to learn the majority language directly, without benefit of a visual system that is complete, conventionalized and predictable, as native languages are.

Research shows that even signers skilled in invented sign systems omit many signs for English words, or morphemes, particulary function words and affixes (Kluwin 1981; Marmor and Petitto 1979; Swisher 1984). "Thus, the model of English presented to the children is at best incomplete and at worst grossly ungrammatical. This degraded form of English is probably no better a linguistic model than the imperfect ASL the parents would have acquired had they decided to try to use that." (Rudser 1988, p. 104) The choice of an invented sign form by parents seems to reflect the relatively short attitudinal distance between spoken English and sign English, rather than any inherent documented difficulty with the acquisition of ASL (Hoffmeister, in progress).

In Stockholm (Ahlgren 1982), a project was undertaken to use the insights gained from a study of deaf children with deaf parents as the basis for training hearing parents of deaf children. The parents' training began when their children were between the ages of 18 months and 2 1/2 years. The children received no special training but were exposed to native sign language naturally in interaction with their parents. Between the ages of 3 and 4, the same children were compared with children from deaf families, and there were no differences in developmental levels between the deaf children of hearing parents who had been in the training program and the deaf children of deaf parents.

Hoffmeister (1985) asserts that parental attitudes toward the use of native sign language will have an effect on how both parents and child deal with the issue of deafness. Parents who look favourably on native sign language, who learn and use it with their child, and who are knowledgeable about the adult Deaf community will be more comfortable in interacting with their deaf child. (In a later section we will describe other programs being used to teach native sign language to parents of deaf children.)

Membership in the Deaf Community

Countries typically have one or two dominant languages (English and French in Canada), and minority-language users often strive to maintain their language in order to identify with their cultural heritage. In this way, language provides the minority group with a means of passing on the culture to later generations and a means of identity in the minority group. Thus, membership in a group can be determined by the user's skill in the language.

Canadian dialects of ASL are used in English-speaking Canada as a symbol of membership and prestige in the Deaf community. Despite the fact that most school programs provide instruction in English only, most deaf children will use ASL as adults (Fant 1972; Kretschmer and Kretschmer 1978). Membership in the Deaf community is based on hearing loss and the skilled use of the native sign language. Users of sign English who do not modify their communication form towards ASL are not considered full members of the Deaf community (Higgins 1980; Padden and Humphries 1988).

The perspective of the Deaf as a minority group is unique in that Deaf cultural values and mores are often not passed on from one generation to another within the family structure. Rather, they are transmitted via peer interaction among deaf children in school (Woodward 1982). Personality, self-esteem, acceptance, emotional stability, and language are based on demonstrations by other deaf children (Chess, Korn, and Fernandez 1971).

> If we watch the child when he is not with adults...we will see him develop a social life with other children, and we will notice that while he is developing socially he is also intellectually acquiring the power of thought and criticism....But too often education ends by destroying instead of using and developing the desire to cooperate. (Piaget 1932, p. 20)

Studies of deaf adults have shown that deaf children of hearing parents (DCHP) who learned to sign before age 6 in a residential school are considered to have near-native skills in ASL (Woodward 1973).

Cicourcel and Boese (1972) assert that sign language should be considered the native language of all deaf children because of the poor match between the characteristics of oral language and deaf children's processing capabilities:

> Even if the deaf child had never been exposed to any signing...we would still argue that the use of an oral method would not constitute a deaf child's native language. Our argument is based on the hypothesis that a deaf child, because he does not have access to a monitoring system whereby he has continual feedback from his own input and therefore can recursively monitor that output in such a way as to make changes in it over the course of a conversation, cannot acquire oral language as a native....Indeed, the oral language must remain a strange phenomenon for the deaf child because nativeness (as in spontaneous oral-language acquisition) apparently is lost unless there is some kind of reflex feedback. (pp. 40-41)

Rodda (1985), in a review of research on language, cognition, and communication, similarly concluded that "American Sign Language, British Sign Language, or their equivalents seem to be the best way for deaf people to process information through language, and accepting them as instructional languages opens up the whole culture of deafness to deaf children and students, indeed, to all of us." (p. 175)

The Nativization Hypothesis

A large number of studies that discuss children's learning of language with variation in input suggest that the young child has the biological capacity to operate on the input and create a language (Andersen 1983; Bickerton 1982). Gee and Kegl (1983a) applied this concept to the sign input received by a deaf child. The language the child learns from is a pidgin, which is a variation of the language, and in most cases, an impoverished model for the child. Children's bioprograms or innate capacities assist them in making sense of the

input and generating organizing principles which result in a language that is much closer to their bioprograms than the adult language presented to them, but still not a complete system. Thus, the language created by the child is considered to be a creole.

The young deaf child who is not exposed to a formal sign language is able to make sense out of the gestural input from the hearing mother and produce a more conventional gesture language (Goldin-Meadow 1983; Goldin-Meadow and Feldman 1975; Goldin-Meadow and Mylander 1984). Wodlinger-Cohen (1986) reported that the deaf child is not only capable of learning the system, but is also able to adapt to the adult's preferred sign behaviour.

Several studies (Gee and Mounty 1986; Goodhart 1984; Mounty 1986) of the signed production of DCHP have been conducted to discover whether the children demonstrated a tendency to develop more ASL-like forms in their expressive language, even when they did not receive the forms in their linguistic input. If this were the case, it would provide support for the "nativization hypothesis", which holds that without adequate input in a natural language, grammar will develop along a set of internal norms which are part of the innate human capacity to develop language.

Gee and Mounty (1986) videotaped two DCHP in their retelling of a story to a deaf native ASL signer and then to a hearing adult signer. Neither adult was known to the children. Of the two DCHP, one of whom had received more ASL-like input and one of whom had received more English-like input, one child signed like a DCDP in the retelling and the other used more English-like signing. No significant differences were found in the use of the ASL grammatical features under investigation. Gee and Mounty concluded that the DCHP's development of ASL was strongly influenced by the nativization process, and that ASL is closer to the hypothesized internal norms for a visual language, taking full advantage of the three-dimensional nature of the visual linguistic medium.

In analysing how two DCHP and two DCDP signed a "Road Runner" cartoon to each other, Goodhart (1984) noted a continuum of sign forms ranging from an English-based sign system to ASL. As the signs became more ASL-like in form, the signs became progressively more informative and, simultaneously, quicker and more efficient. Two children, one DCHP and one DCDP, showed evidence of nativization in their invention of signs to convey concepts for which the signs were not known.

Livingston (1983) examined the spontaneous language productions of six deaf children, ages 6 to 15. All had been in a signed-English program for at least one year and had no exposure to ASL at school or at home. Results indicated that the children were acquiring signed-English structures in an orderly manner; however, they were acquiring ASL structures such as classifiers, directional signs, and the use of signing space at a considerably faster rate. Livingston observed that "the subjects in this study were more linguistically competent in a language for which they had no living adult model." (p. 282)

Loncke, Quertinmont, Ferreyra, and Counet (1986) analysed mutual communication among Dutch DCHP and DCDP who had been educated orally or through signed Dutch. The utterances of the group exposed to signed Dutch contained elements of Dutch Sign Language (DSL), regardless of the hearing status of the parents. Loncke et al. concluded that an input of signed Dutch does not automatically lead to output in this system.

In a similar study Stroombergen and Koolhof (1986) investigated mechanisms of DSL in classroom communication. Their analyses of videotaped conversations revealed evidence of DSL structures, such as classifier use, negative headshakes, and simultaneous use of the right and left hand. They also identified utterances that were approximations of signed Dutch.

A review of the research on mutual communication among Dutch deaf children and children in other countries led Harder and Knoors (1987) to conclude that although "deaf students who are exposed to a signed version of a spoken language do acquire structures of this signed version, their (mutual) communication, however, does show evidence of the use of mechanisms that can be found also in sign languages." (p. 116)

S. Supalla (1986) compared the production of sign language in DCHP exposed to SEE II and DCDP acquiring ASL. The two groups of deaf children ranged from 9 to 11 years, and all attended day programs for the deaf. All were deaf from birth and had average intelligence. The families of the DCHP used little or no sign, the children's main signing model being their hearing teacher. Comparisons were made on the following: 1) between the two groups of deaf children; 2) within the DCHP group; 3) between the DCHP and hearing teachers. Supalla was interested in how these children produced forms which are produced differently at the surface in both the signed system and in ASL. He found that the DCHP were inconsistent in following the S-V-O rule of English. He also found that within sentences using verbs capable of spatial modifications, all the DCHP children performed some spatial modifications, even though these modifications were not present in their teacher's signing. In the DCHP group some children produced some single agreement for either subject or object, and some children did not use single agreement at all. In dual agreement all DCHP children consistently marked the subject and object within the verb form.

There was a significant difference between the DCHP and DCDP in their use of the forms investigated. The DCHP did not share a common strategy for using the rules. However, each child did show consistency within her/his own individual grammar. Some of the individualized rules were common across children. Most importantly, the DCHP students did not follow the model of sign forms presented by their teacher.

It appears that the DCHP devised a set of spatial marking devices within a model of their own. These findings suggest, first, the powerful tendency to symbolize deixis and semantic/syntactic case relations in sign languages in terms of spatial principles, even when peer interaction is so limited that it prohibits any standardization of the language across

children. Second, the particular types of distinct grammars found across the children provide insight into the arbitrariness of the grammaticalized use of space in natural sign languages, similar to the arbitrary nature of spoken languages.

Slobin (1973) identified four "charges to language": 1) be clear; 2) be humanly processable in ongoing time; 3) be quick and easy; 4) be expressive. ASL meets these criteria, although not in the same way oral language does (Gee and Goodhart 1988). ASL conveys the same amount of information per time unit as does English (Klima and Bellugi 1979); however, ASL conveys more information per unit of meaning to account for the differences in delivery time between the large-muscle movements needed for sign and the small-muscle movements needed for speech. The complex morphological system of ASL allows this to occur (Gee and Kegl 1983b; Klima and Bellugi 1979; Newport 1982; T. Supalla 1982).

In contrast, manually coded English systems do not meet Slobin's criteria. Manually coded systems do not have a complex morphology, thus precluding quick and easy expressive communication. Gee and Goodhart (1988) acknowledge that, given these considerations, manually coded English cannot be considered as adequate input. They indicate that systems combining sign English and oral English provide children with even poorer input because the superimposition of oral English forces the signing to be even more morphologically impoverished.

VI - DEVELOPMENT OF WRITTEN ENGLISH

Because the Deaf community and the hearing community co-exist, interaction between the two communities is essential. When contact occurs between deaf and signing hearing persons, the form of sign language is more English-like. When contact occurs between deaf persons and non-signing hearing persons, that contact will take the form of oral or written English, depending on the oral abilities of the deaf person.

Written English is almost always a viable option and should be promoted as the main route of access to the majority language. The development of communicative competence in a first language (such as ASL), preceded and/or accompanied by the development of the written majority language (such as English), should result in proficiency in both languages. This view is shared by Bockmiller (1981) and Markowicz (1972), who states that true bilingualism for the deaf would mean "sign language competence for interpersonal communication in the deaf community and linguistic competence in English, at least written English." (p. 812)

However, Livingston (1986) warns that literacy should not be the only goal of deaf education. She argues that, when literacy is taken as the only goal, "English is, understandably but mistakenly, viewed as the only language that deaf children must learn....Further, since it is assumed that the more deaf children are immersed in English the better their reading and writing will be, all subject areas are also taught through English." (p. 21) Livingston goes on to discuss the contributions of ASL to the meaning-making and meaning-sharing capacities of deaf children.

A similar conclusion has been drawn with regard to the Swedish language.

> To a deaf student, Swedish is first and foremost written Swedish. It is written Swedish to which the students have access, and their primary need is to be able to read and write....In the teaching of Swedish in the School for the Deaf, we must be able to explain Swedish grammar by reference to how things are expressed in sign language (Ahlgren 1982, pp. 8, 9).

In addition to the studies related to literacy in other sections of the report, studies by Ewoldt have suggested that ASL is facilitative of the reading process and that reading English facilitates the learning of English syntax and vocabulary. Ewoldt (1978, 1981b), using miscue analysis, story retellings, and cloze procedure, described the reading of four profoundly, prelingually deaf children of hearing parents, ages 7 to 17, from a residential school. Three of the four children showed a preference for ASL in their signed reading of stories and in their retellings. The retellings revealed a fairly high degree of comprehension, even when the stories the children were asked to read were several grade levels higher than their measured achievement. The best reader, as judged by retellings and cloze performance, also used the most ASL features in her signing. Improved performance on repetitions of the cloze task

suggested that the students were learning English syntactic patterns through reading. The readers in this study also produced a high percentage of syntactically acceptable English sentences.

Further, the children in Ewoldt's study showed increased understanding of English vocabulary through the repetition of important words in the text. Initially, unknown words were fingerspelled or omitted. After several encounters with these words in the context of meaningful stories, the readers began to sign the words appropriately or use signs that were similar in meaning to the English words.

The success of these profoundly, prelingually deaf readers with hearing parents, in addition to demonstrating the value of ASL for reading and the value of reading for English syntactic and vocabulary development, also suggested the lack of necessity for oral processing in reading and the possibility that standardized tests had underestimated the reading abilities of deaf children.

Again using miscue analysis, Ewoldt (1981a, 1981c, 1984, 1985) investigated the reading process of ten deaf children in a total communication program and ten orally trained deaf children, ages 8 to 14, as well as two groups of hearing children. The miscues of the deaf children, regardless of degree of hearing loss or mode of instruction, were significantly more constrained by graphic information than by phonological information, thus supporting the earlier finding that oral processing is seldom used and unnecessary in the reading of deaf children. The research literature on this issue is mixed, but the contrary evidence comes from studies that have focused on isolated skills rather than the reading of connected texts, which is a more natural task.

The effects of context on reading development are important to this discussion because they also demonstrate that deaf children are capable of learning English syntax through reading. Yurkowski and Ewoldt (1986) conducted a case study of the reading of a profoundly deaf college student, who was asked to read the same story on two separate occasions. In the first reading, the story had been "simplified", whereas in the second reading, the original (and syntactically complex) story was used. The reader made a significantly higher percentage of syntactically acceptable miscues in the second story which, added to other evidence provided in the study, supported the theory that English syntax can be learned through reading when the content is well-known.

Other work (Israelite 1988; Israelite and Helfrich 1988; McGill-Franzen and Gormley 1980; Sarachan-Deily 1980) has shown the facilitative effect of sufficient contextual support and background knowledge on the reading of the deaf. Standardized tests, the almost exclusive source and perpetuating force of the view that the deaf are poor readers, are almost entirely devoid of context and highly esoteric in content (Ewoldt 1985, 1987). Thus, the finding that deaf readers can achieve with background and contextual support demonstrates the inappropriateness of standardized tests to measure deaf readers' ability and dispels the myth that all deaf readers are poor readers.

Other researchers have expressed concerns over the use of standardized reading measures for the deaf. DiFrancesca and Carey (1972) listed three major problems with the Stanford Achievement Test (SAT): 1) the directions for the test are designed for oral administration; 2) the test may not reflect in content or in emphasis the curriculum being implemented for deaf students; 3) testing procedures may not be uniform in every classroom. DiFrancesca and Carey warned against the use of SAT scores to compare deaf and hearing students or to establish norms for deaf students. Similar concerns were expressed by Babbini and Quigley (1970) and Brill (1962).

Also lacking in contextual support are reading materials which have been designed specifically for the deaf and materials that are referred to as "high interest-low vocabulary". These materials do not provide the deaf reader with enough context and are in reality more difficult for the reader for this reason (Ewoldt 1983, 1984).

Israelite and Helfrich (1988) investigated the effects of revisions that improved the text coherence of syntactically controlled basal readers on the reading comprehension of deaf and hearing readers. The sample included fifteen deaf students, aged 10:8 to 13.0 (mean 11:9) with a mean reading grade level of 2.8, as measured by the SAT-HI (hearing impaired version of the SAT). Also included were fifteen hearing students, aged 8:7 to 9:2 (mean 8:8) with a mean reading-grade level of 3.4 on a comparable reading test.

Two representative stories were selected from Grade 2, Level 3 of Reading Milestones, a syntactically controlled basal reading series specifically developed for deaf students (Quigley and King 1982). The stories were revised to improve major aspects of the reader-text interaction, including the surface form of the story, the background knowledge required to understand the story, the nature of the content in relation to concepts and events. Due to the revisions, the difficulty levels of the stories increased from Grade 2 to Grade 3 for Story I and from Grade 2 to Grade 4 for Story II. Fifteen WH-questions common to the original and revised versions of each story were developed, with correct answers embedded in a multiple-choice format.

The deaf and hearing subjects read two stories, an original version of one story and a revised version of the other in a planned counterbalanced order. Following completion of each story, the subjects answered the related Wh-questions. Scores for story type (original vs. revised) were summed and means computed.

Data analysis revealed a significant effect for story type for the deaf students, who performed as well as hearing students on the revised versions; deaf students' performance on the original versions was poorer, with significantly fewer answers correct.

The authors suggested that the increased coherence of the revised texts allowed the deaf students easier access to meaning. These results support Yurkowski and Ewoldt (1986) and McGill-Franzen and Gormley (1980), who argue that deaf readers can use their semantic base to guide the processing of syntax, given well-written, whole texts and sufficient

background knowledge. The results also show that efforts to control readability through artificial manipulations may result in texts that are more difficult, rather than less difficult to understand.

Concerns expressed in the literature over standardized tests and contextually impoverished materials are provided to make the point that the reading abilities of deaf children have likely been underestimated and/or underdeveloped, thus providing an explanation for why the learning of English through print has not been considered a viable route by more educators of the deaf.

Longitudinal research into the emerging literacy of nine deaf children of deaf parents, ages 3 to 6 (Ewoldt 1985, in press), demonstrated that when deaf children with a strong base in a native sign language are given opportunities to experiment with written language in a risk-free environment, they exhibit literacy behaviours that have been described in the emerging literacy of hearing children. Furthermore, these children demonstrated a proficiency in reading and writing by age 6 that was comparable to or surpassed that of most hearing children. One additional child in the study, a deaf child of hearing parents, exhibited the same literacy behaviours as the other children, which suggests that the literacy environment and the language influence of his peers had a facilitative effect.

Maxwell (1984) reported on a profoundly deaf child named Alice and her interactions with books. Alice had deaf parents and deaf maternal grandparents. Her parents had decided to communicate with her first in ASL, followed by the gradual introduction of fingerspelling and sign English. They did not emphasize oral language. Maxwell used videotapes of more than 44 hours of Alice's interactions with her family and various researchers over a four-year period, from the time Alice was 2:3 until she was 6:3.

Books made up an important part of Alice's life throughout the study, and Maxwell reported that her SAT scores were at grade level when she was in Grade 3. More importantly, Alice's progress was described as "remarkably similar" to the reading process of hearing children, as described in the literature, and her re-enactments of favourite books were also similar to the developmental steps identified by Sulzby and Otto (1982).

Fewer process-oriented studies have been conducted on the writing of deaf children than on reading. (The research by Ewoldt on emerging literacy has already been cited above.) In most experimental studies, ASL users have not been treated separately. Of the experimental studies of writing which have focused on ASL users, the level of interest has been primarily that of the word or letter.

Hirsh-Pasek (1981) found that 4-to-6-year-old deaf children with deaf parents could isolate specific handshapes in fingerspelling and signs and relate them to printed letters. Hanson (1982) found that native ASL users were better able to recall fingerspelled sequences that were orthographically permissible than sequences that were not permissible according to the rules of English orthography.

These studies demonstrating that a knowledge of ASL is facilitative of the learning of English should not be interpreted to mean that the deaf child must control all aspects of ASL prior to beginning to read and write. Studies of 3-year-old deaf children's attention to environmental print (Ewoldt and Saulnier, in progress b; Luetke-Stahlman, in progress) attest to the fact that printed English (e.g., stop signs, McDonald's) is not so foreign to the young deaf child as it was once believed. The deaf child has grown up in a world festooned with functional English print, and it is unlikely that that source of information has been entirely ignored. Thus, simultaneous demonstrations of ASL or LSQ and written English or French would seem to be appropriate.

VII - BILINGUAL/BICULTURAL EDUCATION FOR THE DEAF

This section presents salient aspects of bilingual theory and applies them to bilingual/bicultural education for the Deaf. A theoretical framework for bilingual/bicultural programs is also established, with native sign language as the foundation.

The goal of bilingual/bicultural education is to provide deaf students with the facility to function in both the deaf and hearing cultures. This does not mean that acquisition of the majority language is minimized. The majority language remains the written language of the Deaf community and is also necessary for participation in the hearing world. Rather, it means that policy makers acknowledge the cultural significance of native sign languages and their educational role in deaf students' acquisition of majority languages. This position is gaining increasing support in North America (Barnum 1984; Carver 1989; Cummins 1984; Johnson, Liddell, and Erting 1989; Kannapell 1974; Lane 1988; MacDougall 1989; Marmor and Petitto 1979; McIntire and Groode 1982; P. Paul 1987; Quigley and Paul 1984; Reagan 1985; Rudser 1988; Stewart 1982, 1987; Strong 1988; Strong, Woodward, and Burdett 1987; Wilcox 1987); Britain (Denmark 1981; Edmondson 1981; Kyle and Pullen 1988; Kyle and Woll 1983; Lawson 1981; Wickham and Kyle 1987); and Europe (Bouvet 1983, 1984, 1987; Caselli 1987; Deck 1987; Maye, Ringli, and Boyes-Braem 1987). Bilingual education for the deaf is official policy in Sweden (Ahlgren 1982; Tervoort 1983), and its advantages are accepted in most schools for the deaf in Denmark (Hansen 1987; Tervoort 1983).

It is well-documented that young deaf children experience great difficulty in learning and using majority languages. Studies comparing deaf children of deaf parents (DCDP) with deaf children of hearing parents (DCHP) provide evidence that children acquire native sign naturally when presented with fluent models. Proficiency in a native sign language enables deaf children to become proficient in a second language, that of the majority culture.

According to Cummins (1984, 1986), language proficiency can be conceptualized along two intersecting continua: 1) context-embedded vs. context-reduced, referring to "the range of conceptual support available for expressing meaning" (Cummins 1984, p. 138); and 2) cognitively undemanding vs. cognitively demanding, referring to the "developmental aspects of communicative proficiency in terms of the degree of active cognitive involvement in a task or activity." (Cummins and Swain 1986, p. 154)

In context-embedded communication, meaning is negotiated between communicative partners engaged in face-to-face interactions. Linguistic meaning is supported by a broad range of paralinguistic and situational cues. In contrast, context-reduced communication relies on the content of the message itself, and interpretation of meaning is dependent on linguistic knowledge to a much greater extent. "In general, context-embedded communication is more typical of the everyday world outside the classroom, whereas many of the linguistic demands of the classroom (e.g., manipulating text) reflect communicative activities which are close to the context-reduced end of the continuum." (Cummins 1984, p. 139)

Cognitively undemanding tasks are those for which the language is readily accessible, thus necessitating little active cognitive involvement. Cognitively demanding tasks necessitate more active cognitive involvement because the requisite linguistic proficiency has not yet been attained.

This theoretical framework can be readily applied to the education of the Deaf. The context-embedded/context-reduced continuum explains why deaf students may successfully communicate "through-the-air" in some manually coded English form but still experience difficulties in academic endeavour. The rich context of face-to-face interaction allows deaf students to make use of many cues to meaning not available in context-reduced situations.

A major goal of education for deaf students is to develop their ability to work with cognitively demanding, context-reduced texts. Cummins (1984) states, "the more initial reading and writing instruction can be embedded in a meaningful communication context (i.e., related to the child's previous experience) the more successful it is likely to be." (p. 141) This principle also holds true for instruction in the majority language. "The more context-embedded, the more successful it is likely to be, and paradoxically, the more successful in developing L2 (Second language) skills in context-reduced situations." (1984, p. 141)

Cummins' (1986) "interdependence principle" explains the seeming paradox described above. This principle states that "to the extent that instruction through a minority language is effective in developing academic proficiency in the minority language, transfer of this proficiency to the majority language will occur given adequate exposure and motivation to learn the majority language." (1986, p. 20) It is supported by numerous research findings (see Cummins 1984 for review) on bilingual program evaluation, language learning by immigrant students, correlational studies of first- and second-language relationships, and results of experiments in bilingual-information processing. The interdependence principle suggests the existence of a "common underlying proficiency" which allows for transfer of knowledge across languages. "Transfer is much more likely to occur from minority language to majority language because of the greater exposure to literacy in the majority language outside of school and the strong social pressure to learn it." (Cummins 1989, p. 44)

Application of this theory (and its large body of supporting data) to education of the Deaf suggests that a primary reason for deaf students' difficulties in developing proficiency in English subject areas is because much of their instruction is provided through context-reduced, cognitively demanding communication (e.g., English) and is often unrelated to their background and experiences. Cohen and Swain (1976) call this type of immersion "submersion", referring to "...the 'sink or swim' approach where no adjustments are made in the school program to take account of the minority child's cultural or linguistic differences." (Cummins 1984, p. 154) Data from the evaluation of bilingual programs show little relationship between amount of time spent in instruction through the majority language and academic achievement in that language. (Cummins 1984, 1986)

Socio-Historical Factors

Any discussion of bilingual/bicultural education for the Deaf must also consider socio-historical factors. According to Cummins (personal correspondence), the most critical areas are the power and status relationships between the majority group and the minority group (in this case hearing people and deaf people) and their effect on school performance.

Hearing people have historically viewed deaf people in terms of the medical model. "This model has the assumption that differences in physical, sensory or mental capabilities necessarily produce a defective member of society." (Kyle and Pullen 1988, p. 50) From this perspective, deafness has been seen as pathological and the Deaf as people to be "cured" through provision of hearing aids and intensive speech, language, and auditory training.

A natural extension of the medical model has been the identification of deafness as a handicap and the provision of educational services through special education enactments, such as Bill 82 in Ontario and P.L.94-142 in the United States. The federally appointed United States Commission on education of the Deaf (1988) has recently called this practice into question:

> Although laws exist to protect members of language minorities and persons with handicaps, those children who became members of a language minority because of their handicap are not protected: they have fallen into the cracks between two bureaucracies. Lacking the recent evidence that ASL is a minority language, the federal agencies entrusted with promoting the education and rights of minority-language users have so far dismissed deaf ASL users as merely handicapped. At the same time, agencies entrusted with ensuring effective education for the handicapped have, understandably, dismissed the central educational issue for many deaf children--their minority-language status. Agencies have thus attempted to serve children who are deaf just as they serve all other classes of handicapped children whose education is already conducted in their primary language. (p. 40)

As well, the Deaf have had little, if any, input into policies regarding their own education and the education of deaf students. In most jurisdictions it is possible to become a professional in a deafness-related field without achieving a minimum level of competence in sign language. Sign-language classes are electives rather than requirements in many teacher-preparation programs (Maxwell 1985).

Results of an extensive study by Woodward, Allen, and Schildroth (1988) indicated that a majority of teachers of the deaf in the United States are not familiar with the differences between ASL and English. In a similar study in Britain, 30% of hearing teachers surveyed did not consider British Sign Language (BSL) to be a true language (Wickham and Kyle 1987). Hearing teachers also were not able to identify children who were competent

communicators in BSL. In contrast, deaf adults could identify children who used sign English and were more sensitive to language mixes in individual children.

In Canada, only 6.4% of teachers of the Deaf are themselves deaf, according to the Canadian Association of the Deaf (personal correspondence 1989). In the United States, it has been estimated that 12% of teachers of the Deaf are deaf (Erting 1978), but a recent study by Woodward, Allen, and Schildroth (1988) found few deaf teachers at the elementary level (16 in a sample totalling 609). These findings suggest that deaf children are exposed almost exclusively to hearing cultural and linguistic models, and "it is clear that elementary school programs are utilizing an assimilationist approach rather than a bilingual-bicultural approach." (p. 190)

Cundy (1988) conducted in-depth interviews with deaf adults who had deaf teachers during their secondary or post-secondary education. The participants identified shared communication as the most significant factor in the relationship between deaf students and deaf teachers. Deaf teachers also provided positive role models and helped deaf students develop a sense of identity.

Results of a phenomenological interview exploring the role of deaf teachers led Carver (1989) to conclude that "deafness per se becomes a non-factor in classroom interaction between deaf teachers and their deaf students." (p. 67) Carver recommended that teacher-preparation programs become more accessible to deaf candidates. Indeed, a bilingual/bicultural approach requires the employment of many deaf teachers. This, however, necessitates changes not only in training and hiring practices, but also in the present state of power relations between deaf and hearing people. Although the Deaf constitute a minority with a distinct culture, language, and hierarchical social structure (Markowicz and Woodward 1982), educators have paid little attention to their culturally and linguistically different needs. "Deaf people are socialized into an expectation of subordinate roles in society and may be powerless to alter their situation politically, socially, and economically." (Kyle and Pullen 1988, p. 56).

In terms of its relationship to the hearing society, the Deaf can be viewed as a dominated, disempowered minority group (Cummins 1984; Lane 1988; Markowicz and Woodward 1982; Reagan 1985; Wilcox 1987), sharing many commonalities with other dominated minority groups including Native Canadians, and Native, Black, and Hispanic Americans. Like these minorities, "the Deaf community does not participate in control of its own institutions." (Markowicz and Woodward 1982).

The Deaf community is characterized by social and economic discrimination, due to a long history of underemployment (Moores 1987; Rodda and Grove 1987). This may lead to a state of bicultural ambivalence (Cummins 1984) or lack of cultural identification, in which the Deaf demonstrate patterns of ambivalence or hostility toward hearing people, and insecurity or shame about their own language and culture. As well, deaf children may feel alienated from their families due to communication differences and have few adult, deaf role models to

emulate in their environment. "In short, there are striking sociological, linguistic, and educational similarities between the situation for deaf children and that of other minority children who tend to experience academic failure." (Cummins 1984, p. 214)

Thus, Cummins' model suggests that the difficulties deaf students experience in school are not attributable to their deafness, but rather to a disabling educational system which reinforces cultural and linguistic ambivalence through its majority-language immersion orientation. Students in such programs do not develop the social/emotional and cognitive/academic foundation necessary for academic success.

The Commission on Education of the Deaf (1988) asserts that "it has been shown repeatedly that children whose primary language is ASL, like those who speak other minority languages, such as Spanish or Navaho, are at a severe educational disadvantage in a system that disbars, denigrates, and denies their primary language." (p. 42) "Like their Spanish-speaking counterparts, they are being educated in a language they are struggling to learn; unlike them, however, most have no familiarity with any other oral language and cannot hear English, which they must learn by indirect means." (p. 41)

Subtractive and Additive Bilingualism

Lambert (1975) used the term "subtractive" bilingualism to describe the situation that occurs for minority children when their first language (L1) is not respected and is in the process of being replaced by a more prestigious majority language (L2). This form of bilingualism is subtractive because the child's proficiency in both languages is negatively affected by the subtraction of L1 and its gradual replacement by L2. Educators contribute to subtractive bilingualism by communicating to minority children, whether implicitly or explicitly, that their L1 is not valuable, and by teaching, often exclusively, through their weaker L2 (Cummins 1984).

Schein (1984) suggests that some of the academic problems of deaf children can be attributed to subtractive bilingualism. This premise is supported by Luetke-Stahlman (1982), Woodford (1987), and M. Paul (1973) who states, "the deaf person who is truly bilingual and knows both Ameslan and English is rarely encouraged to be proud of both." (p. 41)

The subtractive bilingualism of minority children, including the Deaf, is contrasted with "additive" bilingualism, where majority-language children add a second socially valued language to their repertoire, with continued maintenance and growth of the first, one example being Anglophone children in French immersion programs in Ontario.

A form of additive bilingualism can also occur for children from dominated minorities when their L1 is actively valued and strongly promoted in school (Cummins 1984). Indeed, "Considerable research data suggests that, for dominated minorities, the extent to which students' language and culture are incorporated into the school program constitutes a significant predictor of academic success." (Cummins 1986, p. 25)

Theoretical Framework--Bilingual Program

The Commission on Education of the Deaf provides the following description of bilingual/bicultural programs in the Unites States:

> Bilingual/bicultural instruction includes: academic "subject matters" taught transitionally, at least in the pupil's primary language; English as a Second Language (ESL); the history, culture, and language arts of the student's minority-language group; and American culture and history. The goal is to teach the student English so that he or she can ultimately be educated exclusively in English without falling behind in other studies. This objective is met by fostering a healthy self-image, developing cognitive powers, creating a bridge to the child's existing linguistic and cultural knowledge, and developing reading and expressive skills in English. (1988, p. 42)

> Cummins (1989) suggests four criteria for establishing bilingual/ bicultural programs: 1) minority students' language and culture are incorporated into the school program; 2) minority community participation is encouraged as an integral component of children's education; 3) the pedagogy promotes intrinsic motivation on the part of students to use language actively in order to generate their own knowledge; and 4) professionals involved in assessment become advocates for minority students by focusing primarily on the ways in which students' academic difficulty is a function of interactions within the school context rather than legitimizing the location of the "problem" in the students. (p. 58)

These criteria can be applied to bilingual/bicultural education for the deaf in the following ways:

1. Strategies for incorporating minority language and culture

> Deaf persons must be acknowledged within the educational system as members of a linguistic- and cultural-minority group. Cummins asserts that what is needed is a "personal redefinition" by classroom teachers of the importance of the minority language and culture. This means that it is critical for educators of the deaf to fully understand native sign language in all its linguistic and cultural domains. Teachers should be knowledgeable about the linguistic properties of native sign language and the majority language, visual and spoken modalities, and cultural issues in the Deaf and hearing communities.

2. Including minority community members in programming

> A bilingual/bicultural program for deaf children requires a professional staff well-trained in the use of native sign language and the majority language and able to demonstrate the linguistic and cultural similarities and differences in both languages.

This background allows for language variation among deaf children to be accepted and establishes a precedent for native sign language to be used consistently and approached positively.

Providing equal status to both languages and communities inside the school system avoids bicultural ambivalence and reduces the internalization of inferior status held by many deaf adults who are products of the current system. All of the bilingual/bicultural programs described in the literature emphasize the critical importance of deaf teachers and/or deaf teaching assistants to students' successful development of native sign languages and majority languages.

3. Providing intrinsic motivation for deaf students

The curriculum in a bilingual/bicultural program would provide children with opportunities to express and share meaningful personal experiences in their native language (Cummins in press). This type of program creates a positive self-image in deaf children, enabling them to feel accomplished and ready to learn the majority language. Moreover, the children are fluent in a language that can serve as a support for developing literacy and acquiring facility in the majority language.

Literacy includes, but is not limited to, majority-language reading and writing. Literacy for the deaf includes storytelling by members of the Deaf community, a tradition which passes on the language and culture to deaf children (Hoffmeister in press). Some bilingual/bicultural programs in the United States (Strong 1988) and France (Bouvet 1984; Deck 1987) are based on storytelling, first in native sign language and then in the majority language.

Teachers who construct, expand, and modify stories in native sign language motivate students to create their own stories. The children's pride in their stories, their language, and their culture should occur not only in the classroom, but within the community and the home.

4. Assessment

Critical to the establishment of a good bilingual/bicultural program is a qualified assessment team who serve as advocates for the deaf child and do not automatically assign the locus of an educational problem to the child's deafness. At least one of the examiners should be a deaf professional whose native sign language and majority-language communication is more advanced than that of the child (Greenwald, Hoffmeister, and Kourbetis 1985). This will assure that the deaf child understands the task. In addition, the deaf professional would more likely be sensitive to communicative strategies in native sign language, such as appropriate eye gaze.

Any test used must be reviewed for both obvious and subtle bias against the child. Bias may appear in the form of questions relating to sound (i.e., music, telephone) or to culture (i.e., etiquette judgements based on gestures, such as pointing). The team approach enables the testing situation to be reviewed from a variety of perspectives, thus avoiding any majority-language bias. However, concerns raised about testing in a prior section, would contra-indicate the use of standardized tests, regardless of these cultural considerations.

Bilingual/bicultural education must include strategies to empower deaf students and emphasize the influence of the majority culture. In additive bilingual/bicultural programs, where language and culture are shared through meaningful interactions with teachers, peers, and members of the Deaf community, deaf students are empowered to become literate members of both the Deaf and hearing communities.

Research on Bilingual/Bicultural Education for the Deaf

Recognition of the value of sign language in Europe has increased since the Seventh World Congress of Teachers of the Deaf in 1981 (Rondal, Henrot, and Charlier 1986), but differences in philosophies can be noted. In Scandinavia, Sweden and Denmark have tended toward bilingual education and the use of native sign language; however, this trend has not occurred in Norway (Vogt-Svendsen 1983) or Finland (Rissanen 1987).

In Europe, although the existence of native sign languages is acknowledged, most countries have opted for a signed form of the spoken language. In general, educational policies for countries such as Belgium (deVriendt and Moerman 1987), Britain (Wickham and Kyle 1987), France (Rondal, Henrot, and Charlier 1986), Germany (Prillwitz 1987), Italy (Caselli 1987), the Netherlands (Harder and Knoors 1987), Spain (Marchesi 1987) and Switzerland (Maye, Ringli, and Boyes-Braem 1987) support simultaneous communication. This is also the policy in Australia (Jeanes 1987) and the Soviet Union (Zaitseva 1987). The Deaf community in a few countries, such as Spain, is becoming dissatisfied with the majority-language emphasis in programs for deaf children, and "deaf adults are showing greater acceptance of their own language than for sign systems modified for adaptation to oral language." (Marchesi 1987, p. 146).

In the United States, the Commission on Education of the Deaf (1988) has:

1. Endorsed ASL as a minority language.

> We recognize that ASL is a language in its own right. Over the past decade, there has been a rapid accumulation of evidence that the sign languages of the world are fully developed, autonomous, natural languages with grammars and art forms all their own. Accordingly, the United Nations Educational Scientific and Cultural Organization has concluded that such languages should be "afforded the same status as other linguistic systems" and should play "an active part in...educational

programs for the deaf." ASL has received particular study and informed scholars agree that ASL is one of our country's authentic minority languages. Several states have recently passed legislation providing for the teaching of ASL in the schools on the same basis as other indigenous and foreign minority languages in the United States. (p. 40)

2. Recommended that those whose primary language is ASL, regardless of whether they learned it from their parents, be considered as minority-language students rather than handicapped students and as such, be considered eligible for federally assisted services under the Bilingual Education Act.

3. Supported bilingual-bicultural education for deaf students who use ASL.

> Scientific studies have demonstrated that a child who is unable to use language fluently at home and at school is severely disadvantaged in cognitive development and education. The potential advantages of extending bilingual-bicultural programs to ASL-using children are similar to those for other language-minority children. There would be an infusion of new ideas and methods for teaching this minority, including new strategies for teaching English; improved English literacy; improved academic achievement scores; improved emotional adjustment; decreased need for counseling services; increased class size, without reduction in individualized attention; decreased dropout rates; decreased underemployment on leaving school; increased bilingual fluency of classroom teachers; teaching careers opened to adult minority-language users; enhanced teacher-pupil communication; and enhanced parental communication with teachers and pupils. (p. 42)

Programming in Bilingual/Bicultural Education

Bilingual/bicultural education programs for the deaf are evident at all levels, from preschool to post-secondary. The emphasis, at present, appears to be at the preschool (including kindergarten) and primary levels. A number of the programs reviewed are in initial stages of development and have not yet attempted systematic study and dissemination of research results.

A. Preschool and Primary Programs

Reports of preschool and primary programs from Canada, the United States, France, and Denmark are available in the literature. The following section will briefly review each of the programs and describe their unique characteristics.

1. Preschool and primary programs in North America

The Deaf Children's Society of Vancouver, described in Freeman, Carbin, and Boese (1981), supports a bilingual/bicultural approach to the early education of deaf children and their parents. Deaf children are encouraged to become fluent in ASL, manually coded English, and reading and writing. "As a matter of policy, the Society does not believe that teaching formal English with all of its linguistic and grammatical forms is necessary or appropriate in early childhood." (Carbin 1988, p. 59) However, deaf children participate in activities designed to facilitate acquisition of a strong language base.

The director, who is himself deaf, emphasizes the importance of Deaf culture and deaf role models and language models to deaf children and their parents. Deaf-community participation is incorporated into all aspects of the program, with prelingually deaf native signers serving as preschool teachers, home visitors, and ASL instructors.

Greenberg and Calderon (1984) reported on the results of an independent evaluation which compared deaf children and their families enrolled in the Vancouver program to matched controls who received less systematic and comprehensive intervention. The authors reported "significant and meaningful differences in child and parent communication, social competence, and maternal stress" (p. 4) in favour of the group involved in the program. Greenberg, Calderon, and Kusche (1984) also found more developed natural communication and higher quality interactions in this group.

Strong (1988) and Strong, Woodward, and Burdett (1987) described an ongoing experimental bilingual program, based on storytelling, which is being used to teach language to young deaf children in the United States. Goals of the program are to 1) develop and expand children's use of ASL and use ASL to teach English; and 2) develop awareness of ASL and English as separate-yet-equal languages.

The curriculum consists of a series of children's stories (culturally adapted for the deaf when necessary), each of which focuses on separate aspects of language. The curriculum is divided into two parts: Part 1 deals with ASL only; Part 2 introduces manual English through ASL. The teacher is a native deaf signer of ASL who is also bilingual in English. She is an experienced teacher of the deaf and has received extensive training in the art of storytelling. The program emphasizes the use of language to tell and role play stories, and request and provide information. Videotaped stories are used to supplement live presentations and activities.

An experimental class included eight profoundly, prelingually deaf children, aged 4-7, matched with eight controls who did not receive the program. Progress was evaluated using a signed repetition task (Strong, Gold, and Woodward 1986) that

measured knowledge of English and ASL, and a recognition task that measured awareness of both languages.

Results of this experimental program have yet to be disseminated. However, Strong (1988) reported an enthusiastic response from participants and their parents and the eventual support of an initially skeptical school administration.

Finnegan and Goodhart (1987) studied the development of story-telling in young deaf children involved in a bilingual/bicultural program and its effect on writing. The approach involved the following components: storytelling by the teacher, role playing and storytelling by the students, and story writing. The authors discussed the importance of repeated role playing on children's developing concept of story, likening role playing to "through-the-air drafts". Children changed and elaborated their stories as their role playing progressed.

In their storytelling children demonstrated code switching, spontaneously telling English-based stories to teachers and ASL stories to classmates. Finnegan and Goodhart observed that the ASL stories were richer in detail and had clearer transitions. Children also revised their stories as the storytelling progressed, creating additional drafts.

By the time the children began to write stories, they already had experience in story planning and revision "through-the-air". The authors reported the first written drafts to be generally clearer and more descriptive than previous stories written without the role playing and storytelling. They concluded that "self-initiated through-the-air 'drafting' is an important precursor of successful writing." (p. 21)

The TRIPOD Program in Los Angeles uses a bilingual/bicultural approach that incorporates all modes of communication--ASL, Signed English, speech, audition, reading, and writing. TRIPOD is currently working with researchers at the National Technical Institute for the Deaf in Rochester, New York, to study aspects of the educational program. A major interest is the code switching that has naturally developed among the deaf students, ages 2:6 to 6. Kirchner (personal correspondence) hypothesizes that the children have acquired this ability through the linguistic melding that occurs in TRIPOD's team-teaching approach, which includes both a deaf and a hearing teacher.

2. Preschools and primary programs in Europe

Bilingual/bicultural education in France has been reported by Bouvet (1983, 1984, 1987) and Deck (1987). French Sign Language (LSF) is presented as the first language, and parents are encouraged to learn LSF as soon as their child's deafness is identified. Classes for deaf children are conducted by deaf teachers. As LSF is established, spoken and written French are introduced by hearing teachers.

The program described by Bouvet (1983, 1984, 1987), located in Paris, focuses on language and communication only. It is based on storytelling from picture books, related first in LSF and then in spoken French. Bouvet (1984) identified three stages in the language acquisition of the children in this program: 1) visual attention to the language activities; 2) acquiring language for play purposes (e.g., sign play and vocal play); and 3) acquiring language to communicate meaning. Research indicated that the children acquired the rules of LSF faster than the rules of spoken French.

Reading is introduced as soon as the children begin to develop LSF. "They [the children] begin learning to read at the same time they start to use a language in which they have no handicap. The fact that no phonetic correspondence exists between written French and French Sign Language doesn't hamper their learning. These findings fit with recent evidence concerning the role of grapheme-phoneme relationships in learning to read, in which it has been discovered that this decoding ability is the result of reading ability rather than the basis of it." (Bouvet 1983, p. 70)

Bouvet (1982) conducted an earlier study in a Parisian nursery school class. The subjects were profoundly deaf children with a personal history of communication failure, despite early detection and an intensive oral education. Two teachers worked simultaneously with the children; one was deaf and used LSF; the other was hearing and used oral French. Much of the time was spent telling stories to the children. To develop reading and writing, written messages were matched word for word with the oral messages of the hearing teacher and the signed messages of the deaf teacher. To our knowledge, results of this study are not available.

Deck (1987) discusses bilingual classes at the nursery and primary level which were formed by the association, Deux Langues Pour Une Education (2.LPE), an organization of deaf people, hearing people, and parents of deaf children. The 2.LPE organization currently operates eight classes enrolling 50 deaf children in integrated settings. Key aspects are as follows: 1) parents are expected to learn LSF and actively participate in the program; 2) children's natural acquisition of LSF is supported; they are taught French as a second language, with an emphasis on the written form; 3) curriculum for deaf children is the same as that for hearing children, and there is no delay in the progressive acquisition of age-appropriate knowledge; 4) primary instructors are deaf teachers who are fluent in LSF; hearing teachers serve as assistants and interpreters for integrated classes; 5) all subjects are taught by deaf teachers in LSF; 6) deaf children are integrated into hearing classes as much as possible, with interpreter support; hearing children are integrated into deaf classes for activities such as storytelling in sign with interpreter support; 7) teachers and assistants participate in comprehensive and ongoing professional training.

The Geneva School for the Deaf in Switzerland introduced a bilingual policy with LSF as the first language in 1980 (Maye, Ringli, and Boyes-Braem 1987). All members of the school community, including deaf staff, hearing staff, and deaf

children, use LSF in their daily interactions. Although both spoken and written French are part of the curriculum, the teaching of French is accomplished primarily through written language.

The use of LSF in the preschool is considered to be particularly important. Parent training in LSF is provided weekly, and families also meet with deaf professionals.

Although the bilingual program at the Geneva School for the Deaf is whole-heartedly supported by administrators, staff, and a majority of the parents, some parents do not support the philosophy. The authors did not describe alternative options for those uncomfortable with a bilingual approach.

Gremaud and Alisedo-Costa (1986) described an educational program carried on since 1978 simultaneously in Fribourg, Switzerland and Paris, France. Here, as in other French and Swiss programs, written language is taught directly to deaf children without their prior acquisition of oral language. Teachers make written messages available to deaf children (billboards, signs, etc.), which are first understood globally. These messages must have real meaning and functional value for the deaf child.

Independent of written communication, the children interact with their hearing teachers in sign language. A deaf adult is occasionally present in the class and communicates with the children in LSF. Oral communication has equal importance in interactions between teachers and children, but it is not considered a substitute for written exchanges. The authors reported that this experiment and its results were satisfactory, but no detailed report has been published, to our knowledge.

In Denmark, most schools have acknowledged the advantages of the bilingual approach, and experimental classes have been set up throughout the country. Hansen (1987) described her experiences with a bilingual class established in 1982, at the request of parents of nine deaf children, ages 2 to 4. Two of the children were DCDP, whose Danish Sign Language (DSL) was equivalent to the spoken Danish of hearing age-mates. The remaining seven children were DCHP, most of whom communicated through a combination of signed Danish and speech.

Four teachers conducted the class, including three hearing teachers and one deaf teacher who was familiar with DSL. The teachers recognized that they were not able to provide adequate adult models of DSL and recruited deaf assistants and other deaf adults to join the teaching staff.

At the beginning, the program was essentially monolingual and focused on the acceptance and use of DSL. During the first two years the program gradually changed into a true bilingual approach with Danish as an equally important part of the curriculum.

Hansen reported "...continuous and radical progress in the children's general ability to communicate ever since they started in the programme." (p. 84) All but one child performed linguistically at age-appropriate levels. Children whose parents did not know DSL automatically code-switched when communicating with their families.

The author discussed difficulty in creating evaluations that adequately describe the children's language proficiency. She pointed out that few researchers and teachers "have the native feeling and understanding of the language which will allow them to understand varieties and spontaneous subtleties such as we see happen in the children's language." (Hansen 1987, p. 85) Hansen concluded that the most relevant evaluations are videotapes of children's spontaneous narratives analysed by native signers.

B. Other Public School and Secondary School Programs

Hanson and Padden (1988) reported on a bilingual approach to teaching written English to elementary-aged deaf students fluent in ASL. The program used interactive videodisc technology to provide for student-directed language learning. Students had five self-selected task options: 1) Watch a Story, in which students viewed one of three stories signed in ASL; 2) Read a Story, in which students read English translations of the ASL stories; 3) Answer Questions About a Story, in which students read and answered questions in English about the ASL stories; 4) Write a Story, which allowed students to write an English text for an ASL story; and 5) Caption a Story, in which students wrote English captions for ASL story segments.

Hanson and Padden are in the process of modifying various aspects of the program and providing different levels of text difficulty for the stories. The program continues to be in use at the initial testing site, and it is our understanding that other schools, such as the Alberta School for the Deaf, are considering adopting similar interactive video programs.

A pilot project at the Alberta School for the Deaf offers conversational ASL to deaf students in three classes, one at the elementary level, one at the junior high school level and one at the senior high school level. The goals of the program are for students to 1) acquire basic communication in ASL, 2) develop bicultural awareness and sensitivity, 3) develop originality and creativity in language, 4) acquire additional concepts and generalizations about language and learning, and 5) develop a desire to extend their proficiency through further language study. These goals are accomplished through a course of study which combines aspects of receptive-and-expressive language use with ASL activities, such as signlore, artistic signing, deaf humour, and the performing arts. Student proficiency is assessed through a comprehensive formative-evaluation program. An accredited course in ASL is also planned for deaf high school students, beginning in the fall of 1989 (Bailey, personal correspondence).

Schneiderman (1986) developed a language program for junior and senior high school deaf students that used ASL to teach English. "The program was developed out of the teachers' sense of frustration in dealing with students who were successful sign-language communicators, but felt like language failures and had very low levels of competence in English writing tasks." (p. 51)

For this program, students related personal experiences to their classmates in ASL. The descriptions were videotaped, viewed, and discussed, and ultimately translated into English. Schneiderman (1986) reported that students developed not only English writing ability, but also "a pride in the richness of their own ability to communicate." (p. 52)

Stewart and Hollifield (1989) developed a team approach for teaching a year-long integrated language arts and social studies curriculum to nine deaf students, ages 13-16. This combined approach, supplemented by field trips and activities, resulted in students spending half their day in a bilingual program.

For instructional purposes, one member of the team, a deaf teacher, used only ASL to teach social studies. The other, a hearing teacher, used sign English and speech to teach language arts. The authors felt that the separation of languages, by teacher and subject, helped maintain consistent linguistic input. Both teachers had receptive competence in both languages, and students were permitted to use their preferred mode of communication. Students tended to use English-like sign with the hearing teacher and ASL with the deaf teacher.

Stewart and Hollifield indicated that the bilingual team-teaching strategy was effective in promoting student motivation and participation. The use of ASL for discussions and presentations also appeared to facilitate student understanding and achievement of educational goals.

C. Post-Secondary Programs

The Deaf Human Services Training Program (N.D.) at the Winnipeg Community Centre of the Deaf offers on-the-job training to improve employment opportunities for deaf people, provide role models for the Deaf community and deaf children, and improve the quality of services to deaf people. The program views the Deaf community from a cultural rather than pathological perspective. It recognizes ASL as the primary language of instruction and acknowledges the preferences of adult deaf learners with regard to instructional techniques.

The program provides access to jobs in the human services area by educating not only deaf workers, but also the hearing workplace. Thus, assistive devices, interpreting services, and instruction in ASL for hearing co-workers are integral parts of the program.

Placements for deaf adults are with government and social service agencies and include positions such as: 1) recreation co-ordinator for the Deaf community; 2) cultural intermediary for interpreter referral service; 3) church-sponsored, community-outreach worker; 4) teacher aide for deaf preschool program; and 5) case worker and life-skills tutor for deaf clients.

The project has an extensive evaluation component to assess efficacy from the perspective of the trainees, professional staff, employing agencies, and the Deaf community. A particular focus is on ASL as the language of instruction and workplace communication. Results of the evaluation will be disseminated following the termination of the project.

Harley (1989) reported on a pilot, three-week residency program at the University of New Brunswick (UNB) to train deaf adults as native-sign- language instructors. The program was developed, in part, as a response to concerns about the quality of sign-language classes conducted by non-native signers. Harley indicated that "...the question of an instructor's knowledge of the language and degree of teaching skill has too often been given inadequate consideration. The result has been that countless hearing students graduate from sign-language classes taught by hearing people with a set of signs that mean little or nothing to the deaf people with whom they want to communicate." (p. 88)

Participants included 20 candidates from across Canada who were fluent in sign language and well-accepted by the Deaf community. All were high school graduates, and 19 had advanced degrees from post-secondary institutions. Fifteen candidates used ASL, two used a manual English code, and three were fluent in LSQ and also competent in ASL. The curriculum covered deaf culture and language, teaching materials, and curriculum and instructional techniques. Theory and pedagogy in adult education and second-language training were also incorporated into the program. The primary instructors were North American authorities, two deaf and one hearing, noted for their expertise in the above areas.

Program effectiveness was evaluated by comparing candidates' responses on preliminary and follow-up questionnaires. Responses showed positive changes in attitudes, expectations, and perceptions of competence in sign-language teaching. "The evaluations showed striking changes in the participants' degree of assurance in dealing with the hearing world and confidence in their ability to gain employment from the hearing." (Harley 1989, p. 91)

At the Pima Community College in Tucson, Arizona, Brodesky and Cohen (1988) developed a series of two one-semester courses to enhance deaf students' achievement in required English-composition courses. The course focused on videotaped performances of literature in ASL signed by deaf people. Performances included original ASL compositions, examples of ASL culture, or skits written by the instructors and actors to illustrate particular vocabulary and grammatical structures. Videotapes were supplemented by lectures, group activities, and workbooks containing English, glosses of the ASL performance, English vocabulary, grammar lessons, and practice activities. Pre- and post-data in ASL and written

English have been collected to monitor student progress, and it is anticipated that the data will be analysed during the summer of 1989.

Anecdotally, Brodesky (personal correspondence) reports that the students are highly motivated, enthusiastic, and co-operative. Gains in self-confidence, Deaf pride, and English writing ability have been noted, and students are formally requesting that more such courses be made available. The authors are now involved in a similar program at the Arizona School for the Deaf and Blind.

D. Parent Education

The unique nature of the deaf child's family circumstances requires that parent education be an essential component of the educational process. Of the programs reviewed above, all those at the preschool and primary levels (where reports of this approach have been focused) include provisions for parent education in native sign language and culture, and interaction with deaf adults. A review of the literature revealed three additional articles that emphasized or specifically dealt with parent training in sign language.

The Deaf Children's Society of Vancouver (described previously) has a comprehensive program of parent education designed to expose parents of preschool deaf children to Deaf culture and ASL. Parents receive weekly home visits from prelingually deaf native signers who teach ASL, provide information, and serve as role models and language models. Parents attend weekly group meetings which include instruction in ASL and lectures by speakers representing the Deaf community, agencies serving the deaf, and deafness research groups.

The Society also sponsors special events for parents, such as the annual Summer Parent-Deaf Child Learning Vacation Experience Program. Carbin (1988) believes that activities such as this provide hearing parents "gradually with the opportunity to acculturate themselves to deafness." (p. 59)

Ahlgren (1982) briefly describes a program which includes formal courses and informal meetings between hearing parents and their children, deaf parents and their children, and other deaf persons. Course content was based on the insights acquired during a study of interactions between deaf parents and their children.

During a 1 1/2-year period beginning when the children were 1:6 to 2:6, parents received 60-70 hours of formal instruction and attended informal meetings for approximately 150 hours. The children received no special training.

At the close of the program, when the children (at ages 3 to 4) were compared to children of deaf parents, no differences in developmental levels were noted. "These results and other experiences have inspired parents throughout the country to acquire a similar knowledge and it is now becoming increasingly common for deaf children of preschool age to

display a level of linguistic, cognitive development that is fully comparable with that of hearing children of the same age." (p. 5)

Christensen (1986) investigated the efficacy of a trilingual (Spanish-English and Sign Language) program of instruction in conceptual sign language, presented on weekly cable television. Participants included 58 Spanish-speaking volunteer families who had a deaf child enrolled in an English-language public school program which incorporated the use of a manual English code. The families agreed to watch the televised program at least once per week for a period of two years.

Participants were evaluated six times, including a pre-test, four periodic evaluations, and an exit interview. Results were that 93.8% of the families demonstrated positive overall change in receptive sign-language ability and 86.7% in expressive sign-language ability. Parental attitude toward their child's deafness and toward school became more positive as the parents became more fluent in sign. Parents also began to acquire receptive ability in spoken English as a result of the program.

Although this program did not teach ASL, it would readily lend itself to such application, particularly for minority-language families. The use of television would provide increased access of sign instruction to families who cannot attend local classes.

Hill (1984) described an approach for families who live in sparsely populated areas, too far from centres where sign classes are typically offered. This was a Summer In-Home Signing Program, sponsored by the Alberta School for the Deaf. The goals of the program were to: 1) promote more effective communication between deaf children and their families; 2) give families opportunities to interact with young deaf adults; and 3) provide employment opportunities to secondary and post-secondary students with proficient signing and good written English as home educators.

Following a five-day training period, the home educators lived with families of deaf children for periods of one to three weeks. During their stay, the educators participated in family life and provided one hour of structured instruction in Pidgin Signed English, each day. Evaluation included observation by the program supervisor and interviews with parents and home educators. Results indicated benefits for all families who participated, particularly for those who had some previous sign language experience. It was recommended that future home educators receive more training in how to teach sign language and more information about how to repair communication breakdown. Hill (1984) indicated that through interactions with the home educators, families gained a deeper understanding of deafness and became more relaxed about their child's deafness.

VIII - DISCUSSION

The feelings people have for their native language are among the strongest of human emotions. Personal and societal attitudes toward that language--its suppression or acceptance--have profound impact on the individual's sense of self-worth. It is for this reason that an invading country will often assert its power over the conquered by insisting that the language of the invaders be learned and used. It is also for this reason that when two cultures co-exist, the language of the dominant culture will be considered more complete and more worthy of use in the marketplace and the school, while the language of the suppressed is considered not to be a "true language" and is taken as proof of the ignorance of the users of the language.

Until recently, the Deaf people of North America bought into the myth that their language of signs was not a true language and that they showed their ignorance each time they used it. They submitted to having their hands tied and other degradations whenever they were discovered using gestures, and their feelings of self-worth inevitably suffered. With the revolutionary research of Stokoe and his colleagues, followed by the work of Bellugi and Klima, and sign-language researchers worldwide, attitudes toward native sign languages have finally changed, and Deaf people have become proud of their language and their culture.

Until recently, the climate in North America was not conducive to a discussion of the merits of ASL in the classroom or to a recognition of the Deaf as capable of determining their own needs and making their own destiny. More than any other single event, the Deaf President Now movement at Gallaudet University in Washington, D.C. (now known as DPN week) convinced the world that the Deaf were a power to be reckoned with--not that there was anything to fear from the Deaf community, but that here was a consolidated force that was not going to allow the paternalistic hearing world to make their decisions for them any longer. MacDougall (1989) stated, "What is most important, and what is at the core of the present revolution, is the fundamental right of the deaf person to participate fully in all aspects of their life, including the choice of communication method." (p. 2) Throughout the preparation of this report, the warmth and enthusiasm of the response to requests for information were evidence of widespread emotional support for the use of native sign languages in schools.

This chapter summarizes and ties together the information in each of the preceding chapters, to help the reader understand the rationale for the inclusion of the particular topics. As well, conclusions from the research literature are discussed and their relationship to the effective use of native sign language as a means to majority-language acquisition are delineated.

The first area of consideration in this report was the research literature comparing deaf children of deaf parents (DCDP) and deaf children of hearing parents (DCHP). The studies reviewed found DCDP superior to DCHP in academic achievement, reading and writing, and social development. In most cases, there were no differences in speech and speechreading for these two groups.

Studies completed in the 1960s, by researchers, such as Stuckless and Birch (1966) and Meadow (1968), played a crucial role in the change to total communication from oral communication. Subsequent research in the United States continued to support this trend with DCDP outperforming DCHP in most areas.

Scholars in other countries conducted similar research and reported similar findings. In Denmark, DCDP communicated more proficiently with peers, using less pantomime and more conventional signs than DCHP (Hansen and Kjaer-Sorenson 1976); DCDP in Israel scored significantly higher than DCHP in reading comprehension, emotional development, self-image, and motivation to communicate (Weisel 1988); and in Greece, DCDP were superior to DCHP in receptive and expressive communication, and speechreading (Kourbetis 1987).

These findings are attributed to the influence of the family environment and the beneficial effects of early manual communication. In families with deaf parents, the child's deafness is readily accepted, resulting in a healthy environment conducive to social, emotional, and cognitive development. Deaf children of deaf parents are also immersed in a language environment where communication occurs through the naturally comprehensible modality of native sign language. Mutual interactions between parent and child thus can progress in the natural, relaxed way so necessary for language development.

An area of related research focused on the use of gestures by parents of deaf children. Corson (1973) observed that oral deaf parents use gestures when communicating with their deaf children and that these gestures differ from the kinds used by hearing parents. DeVilliers (1988) further showed that oral deaf parents exploit the visual modality of gesture, parallel to speech, to increase their chances of being understood by their children.

Studies of mother-child interaction show great similarity between the interaction of deaf mothers and deaf children, and hearing mothers and hearing children. These mothers adjust their input to accommodate their children's receptive language abilities, and incorporate aspects of non-verbal communication such as eye gaze, gestures, and turn-taking behaviours into early interactions. Patterns of interactions, such as these, are important for social interaction, sophisticated communication, and healthy emotional development.

Results of the studies reviewed suggest a continuum of mother-child interaction, based on the use of sign language and gestures and other aspects of non-verbal communication. The most desirable pattern is that demonstrated by deaf mothers, who use native sign language to communicate with their deaf children. The least desirable pattern is demonstrated by those hearing mothers who restrict their communication to speech only, with no visual/gestural support.

A common principle of education for young deaf children has been to immerse them in a language-rich environment in which there are many opportunities to communicate. A corollary is that the language-rich environment simulate the environment experienced by hearing children. Findings for DCDP versus DCHP and studies of mother-child interaction suggest that the language-rich environment should instead simulate that experienced by deaf children of deaf parents--an environment rich in both a shared native manual-communication system, such as ASL or LSQ, and in the kinds of gestures and other forms of non-verbal communication that young children naturally incorporate into their conversations. This recommendation for deaf children is similar to that for hearing children in which teachers are encouraged to create a school environment that simulates the home environment in terms of adult-child interaction.

The acquisition of native sign language by deaf children of deaf parents has strong parallels to the developmental stages of hearing children learning their native language. Information regarding this acquisition shows that a native sign language can be learned naturally and easily when the child has sufficient exposure to it. Hoffmeister and Wilbur (1980) have concluded that "...language when presented in a visual mode can be acquired easily and in the same quantity and quality as language presented in an oral-aural mode." (p. 75)

Further, by showing that deaf children of deaf parents go through the acquisition process in the same way as hearing children, support is provided for the idea that the findings of the comparison studies were enabled by the fact that the children were acquiring a native language in the "normal" way.

Once again, many of these studies show that the learning of speech by deaf children who have a base in native sign is not prevented. In fact, the work on code-switching by deaf children shows that they are capable of moving from one modality to the other as contexts of situation and conversational partners change. That is, signing deaf children will often speak in the presence of hearing persons, and oral deaf children will often use signs when no hearing persons are present.

Another important finding from this work is that iconicity and transparency, which are said to be more inherent in sign languages than in spoken languages, are not used by deaf children in making generalizations about the language. Rather, they use the morphological properties of sign as cues to the rules of the adult language, and the acquisition of these discrete elements appears to follow the same developmental patterns found in the acquisition of complex morphology in spoken languages. This is important because it counters a common argument that the iconic and concrete nature of sign prohibits the emergence of abstract thought.

Word order is of importance in the acquisition of ASL. Young children rely on an S-V, V-O, or S-V-O word order in early stages of ASL acquisition, even though the complex morphology of the language allows for other ordering. Thus, the more invariant word order of English sentences is not foreign to the child acquiring ASL, and the developmental

sequence is not unlike that of the hearing child learning a highly inflected language, such as Serbo-Croatian. This aspect of ASL acquisition and its influence on the acquisition of a language with a fixed word order, such as English, deserves further investigation and provides intriguing possibilities for a bilingual approach.

The late acquisition of classifiers by children (they are not mastered until around age 8 or 9, just as hearing children do not control all the intricacies of spoken language before that age) confirms the notion expressed by some researchers that classifiers are not learned as lexical items and that they constitute a complex system. Similar findings have been obtained for the POINT, although it is learned much earlier than classifiers. These studies confirm that sign languages are not "simple gestural systems" that can be matched word-for-word with a spoken language. They also demonstrate that the learning of sign languages provides the same kinds of cognitive stimulation and requires the same levels of problem solving as the learning of spoken languages, again disputing the idea that sign languages are cognitively impoverished and concrete and thus detrimental to the cognitive processes of the children acquiring them.

Of further importance is the fact that the acquisition of first signs is at least equal to (and many researchers would say ahead of) the first words produced by hearing children. This again shows that there is no language or cognitive delay inherent in the learning of sign as the first language. Moreover, the sign vocabulary of deaf children acquiring ASL naturally as their first language has been found to be greater than that of hearing children of the same age.

With regard to "phoneme" acquisition, again parallels have been found between the deaf and the hearing child. The interaction of distinctive features and context is evident in the acquisition of any language. Hearing children may not be able to produce the same phoneme in all possible contexts, but they are able to produce the phoneme in isolation or in certain contexts. Handshapes in ASL are comparable to phonemes in spoken languages, and the production of handshapes can be likened to the production of phonemes, in that they are context-sensitive.

Other studies show that the negative CAN'T emerges in ASL before the positive CAN, again paralleling the acquisition of negatives in English, and a comparative study by Deuchar (1987) indicated that the process of negative incorporation in ASL can also be found in the acquisition of negative incorporation in French Sign Language (LSF) and British Sign Language (BSL).

Only a few studies investigating the acquisition of native sign language by deaf children of hearing parents were available in the literature. However, these studies support the comparative studies of deaf children with deaf parents and deaf children of hearing parents, in the important finding that the child's vocalizing does not decrease when sign language is introduced. The authors of these studies have indicated that the children may actually fade signs and use speech when a sign is unknown or when they have not yet learned the equivalent sign process.

The delay of exposure to native sign language, which typically occurs for deaf children of hearing parents, disrupts this natural acquisition process and prohibits the "normal brain-based maturational processes" (Petitto personal correspondence) from proceeding on schedule. In addition, a study by Preisler (1983) describes the differences between early and late signers, showing distinct advantages for the earlier signing children with regard to acquiring the rules of social interaction. These findings parallel the studies of the socio-familial influences of signing in mother-child interaction. As well, this study shows that parents can successfully learn to communicate with their deaf children in native sign language, even while still in the traditional grieving period associated with the discovery of their child's deafness.

In another Swedish study by Ahlgren (1982), parents of young deaf children were successful in learning native sign language, such that there were no developmental differences between the children of the hearing parents who had learned to sign and the children of deaf parents. Given the overwhelming evidence that deaf children of deaf parents excel or equal other children on every measure, this finding strongly supports the use of native sign language by hearing parents.

Hoffmeister (1985) indicates that positive parental attitudes toward native sign language and the Deaf community will enable parents to be more comfortable in interacting with their deaf child and, as a result, to become more effective parents. These positive attitudes cannot be achieved by force. Thus, the research reviewed here does not support the recommendation of Johnson, Liddell, and Erting (1989) that daycare for deaf children be mandatory from the time of identification of the child's deafness. Nor does it suggest that parents of deaf children be required to work a certain number of hours per month in such a facility, as Johnson et al. decree. The emotional stake people have in their own language, as discussed at the beginning of this section, applies equally to hearing parents. Their allegiance to their own language cannot, indeed must not, be broken by the force of law. With adequate information about the value of native sign language, however, parents of deaf children will be able to make more informed decisions.

Typically, hearing parents are not given adequate information, and those who decide to use sign language with their deaf child actually use what Johnson, Liddell, and Erting (1989) call "Sign Supported Speech", which is oral language with signs from an invented sign system (such as sign English) mapped onto it. Major difficulties have been noted when communication is attempted through the use of Sign Supported Speech, or Simultaneous Communication (SC), as it is usually called. Studies have demonstrated that teachers using SC modify their language, usually by deleting portions of the signed forms so that they will match with the spoken language. Other studies have demonstrated that teachers using SC often present one word orally and a different word in sign. Hansen (1980) in Denmark further noted, "...we studied simultaneous communication and found that intonation and rhythm in the spoken language were often ignored by the interpreter or the hearing signer when signing and speaking at the same time." (p. 254)

Despite the problems inherent in the simultaneous use of signs and speech, in comparisons of SC and oral-only presentations, SC was shown to be superior in comprehensibility for deaf students, adding further evidence for the continuum introduced with regard to mother-child interaction. That continuum shows that the least favourable situation for a deaf child is a mother who uses no gestures, and that each increment of additional visual information provides additional benefits for the child.

The studies showing the benefits of SC over oral-only communication provided the impetus for the Total Communication movement, in which all modalities were supposed to be provided and, as such, might be viewed as having contributed a necessary bridge between the oralist climate of several decades ago and the current climate in which the possibility of native sign language use in the classroom is being discussed.

Contradictory findings have been obtained in studies of the effectiveness of learning English through invented sign systems, such as sign English, but Denmark and Sweden have abandoned the idea of using SC in the classroom. Code-switching studies demonstrate young children's facility in learning and using two separate and distinct languages at the same time (but not using them simultaneously). In each of these studies one of the languages was native sign language.

A number of studies have indicated that the deaf child is also capable of maximizing information from impoverished input (such as that received from SC), supporting the nativization hypothesis and the notion that even minimal sign input is helpful. Nevertheless, the system of language generalized by the child from a less-than-complete sign input is not that of the adult signer in many respects. Maxwell's study of the bound morpheme rules generated by deaf children exposed to an invented sign system is a case in point.

Studies reviewed in a later chapter support the concept that much of what a deaf person knows about English syntax and vocabulary comes from written English and that knowledge of ASL facilitates the ability to use that information. Livingston (1983) cautions that sign English should not be viewed as a necessary or even viable route to literacy in English. The incomplete system internalized by deaf children exposed to SC has varying potential for facilitating the learning of written language, which in turn contributes to the extent to which each individual child will be able to use print information to learn more English. This, perhaps, provides an explanation for the mixed findings with regard to the effectiveness of learning English through the simultaneous use of spoken English and signs.

Concerns expressed in the literature over the use of standardized tests and contextually impoverished reading materials are provided to make the point that the reading abilities of deaf children have likely been underestimated and/or underdeveloped, and to explain why the learning of English through print has not been considered a more viable route by most educators of the deaf. One problem with trusting in quantitative measures is that they mask individual performance and obscure other issues. For instance, there are hearing children being taught by teachers who share the same language, who still do not attain "grade level"

achievement. The nature of the mechanistic model of education is that there must always be people who do not achieve the "norm," and this would be true if all deaf children had access to ASL in the classroom, as long as educators hold to the "reality" of the bell-shaped curve and the myth of grade levels.

This is not to say that teachers, parents, and deaf people themselves should be satisfied with the current educational status of the deaf, but to claim that there is more to the problem than that deaf people have been denied the use of ASL. Education, like all human endeavours, is highly complex, and we can no longer take a mechanistic, step-by-step, hierarchical approach and expect the problems to be solved, making the assumption that the suppression of ASL is the only cause. The prevailing model has failed too many children. What is needed is a different worldview--a holistic approach to education of the deaf that encompasses more than the choice of languages (Ewoldt in progress).

This worldview is one which would result in changes, not only in the language rights of deaf children, but in issues, such as patterns of classroom discourse, methods of teaching, choices of materials, and in broader issues, such as redefining the role of a teacher, redefining what constitutes success, and adopting a new view of what learning is all about.

There is a view of learning that recognizes that each of us as individuals must discover for ourselves and make sense of our discoveries in accordance with our background stores of knowledge about the world and our past experiences with learning. In this view, teachers can only provide opportunities; they cannot pour knowledge into the head of the learner. In this view, teachers see themselves as learners about learning and engage in the learning process alongside their students, taking their cues from the children.

This means that traditional patterns of classroom discourse, described in a substantial body of research literature, must give way to different patterns of inquiry. The behaviourist pattern of teacher question-pupil response-teacher reinforcement is not a viable pattern within this view of learning, and this definition of the teacher's role. New questions to be asked are, What do you mean? How did you do that? How did you figure that out? Can you give an example? How does that fit with what your classmate just said? Can you explain it another way? and so on (Duckworth 1987). This also means that children should have decision-making power over choices of materials to read and topics to write about. Ownership of the process leads to empowerment both for the teacher and for the children.

Ewoldt (1985) showed that reading and writing are not skills but language processes, which can be acquired naturally by deaf children of deaf parents when they are provided demonstrations of printed language used for real purposes and when they have opportunities to experiment with written language. In this process there is no room for the old notions of direct instruction or reading readiness. Children are born with a readiness to make sense of their world. With demonstrations and experimentation, they can make sense of print (Smith 1988). This means that they must have access to genuine instances of print--whole texts that are written in natural language--not watered-down versions for children who (one assumes a

priori) will have reading problems. Further, it should be obvious (but is not in educational circles) that complex ideas require complex language and that deaf children cannot acquire the complexities of English syntax when they are denied access to it in their print sources. There are ways to facilitate content learning without "writing down" to deaf children. Teachers must address these issues, as well as language issues, when planning meaningful, appropriate education for deaf students.

The review of bilingual/bicultural education presents empirical and theoretical research that supports a view of the deaf as a dominated minority group, due to the power and status relationships that exist between the Deaf minority and the hearing majority. The deficit-driven medical model causes deafness to be viewed as a pathology, rather than as a linguistic and cultural difference. Paternalistic attitudes and discriminatory training, hiring and promotion practices have created a tradition of underemployment for Deaf people in the teaching profession and many other career areas. Deaf people also have limited participation in educational policy making and pedagogy. All these factors contribute to the view of the Deaf as a dominated, disempowered minority group.

Bilingual theory and related research findings suggest that for dominated minority-group students, such as the Deaf, there is little relationship between amount of instructional time in the majority language and academic achievement in that language. In fact, research suggests that concentrated efforts to foster the development of the minority language is a far better means of promoting majority-language proficiency. Abilities in the first and second language are interdependent and are based on a common underlying cognitive proficiency which allows for transfer across languages. Transfer is also much more likely from a minority language to a majority language because of greater exposure to the majority language in the environment and strong social pressure to learn it.

In a position paper on The Role and Use of Educational Theory in Formulating Language Policy, Cummins (1988) asserts that "...data or 'facts' from bilingual programs become interpretable for policy purposes only within the context of a coherent theory. It is the theory rather than the individual research findings that permits the generation of predictions about program outcomes under different conditions. Research findings themselves cannot be directly applied across contexts." (pp. 11-12) Cummins' statement implies that, when formulating policy for deaf students, it is not valid to expect the success of majority students in minority-language immersion to be predictive of similar success for deaf students in majority-language immersion. The language policy for deaf students cannot be considered apart from the social, political, and historical context in which it is embedded.

Several predictions about deaf students' acquisition of the majority language can be generated from the theoretical premises of bilingual education presented in this report:

1. That DCDP who have acquired fluency in a native sign language would be able to transfer their knowledge to the majority language. The consistently documented majority-language advantages of DCDP as compared to DCHP support this prediction.

2. That deaf students who lack fluency in a native sign language would not benefit from concentrated instruction in the majority language. This prediction is supported by the poor academic achievement of many deaf students typically immersed in such programs.

3. That an additive bilingual/bicultural program which focuses on acquiring native sign language and learning the majority language, would result in more effective communication in both languages and improvement in academic achievement, and would facilitate deaf students' development of a cultural identity (Cummins 1984). This prediction has been supported by limited research findings in North America, Europe, and Scandinavia. It is also supported by the recommendations of the Commission on Education of the Deaf (1988) in the United States.

The goal of bilingual/bicultural education is to provide deaf students with the facility to function in both the Deaf and hearing communities, with facility in native sign language and the majority language and knowledge of Deaf culture and hearing culture. Bilingual/bicultural programs in Scandinavia, Europe, and North America achieve this goal through a variety of organizational and instructional approaches. In some places, such as Sweden, bilingual education for the deaf is official policy for an entire country; in other places, such as France and Switzerland, it is official policy for specific schools. In North America, bilingual/bicultural education appears at various levels, from preschool to post-secondary.

Of the programs reviewed, the most comprehensive ones are focused at the preschool and primary levels and share the following common characteristics:

1. Native sign language is considered to be the first language of all deaf students, both DCDP and DCHP. Initial instruction is conducted through native sign language, by deaf teachers with assistance from other deaf adults and hearing teachers.

2. The majority language is introduced once deaf children have begun to acquire native sign, frequently by deaf teachers and hearing teachers using a team approach. Proficiency in reading and writing the majority language is emphasized. Instruction in spoken language depends on the philosophies of individual schools and the abilities of individual students.

3. Deaf culture forms an integral part of these programs with deaf adults serving as role and language models. Storytelling, a culturally valued activity, also forms an integral part of the curriculum.

4. Parent education is viewed as an essential component of the educational process. Parents are encouraged to learn native sign language and are introduced to deaf adults, Deaf culture, and the Deaf community.

Although research findings vary for the programs reviewed, results from Sweden and Denmark, where bilingual education is established policy, merit particular attention. In these countries, deaf children of hearing parents achieve the same levels of linguistic and cognitive development as deaf children of deaf parents, and also commonly attain levels of development comparable to hearing age-mates (Ahlgren 1982; Hansen 1987). Code-switching has also been reported for deaf children, not only in Sweden (Preisler 1981) and Denmark (Hansen 1987), but in several programs in the United States (Erting 1980; Kirchner 1989).

Outcomes, such as these, have significant implications for educational policy, as they indicate the value of bilingual/bicultural education for many deaf students. Cummins (1988) states that "...the power relations between dominant and subordinate groups in the society play a major role in determining the choice of issues to investigate, the conduct of research, the interpretation of findings, and the relevance they assume for policy." (p. 11) Thus, the limited nature of present research findings supporting bilingual/bicultural education may be attributed to the sociological context in which this issue is embedded, rather than to other factors.

> As Rodda (1985) has asserted:
> It is understandably difficult for us to accept multiculturalism in an ethnically dominant English-language society, even though research data clearly confirm second-language learning of English is a better approach for many deaf students. Once ASL or BSL is elevated to the status of a first language, the special skills and knowledge of the English language possessed by hearing people become much less important than the skills in ASL, BSL, or an equivalent language possessed by any deaf people. Indeed we establish a requirement that people who choose to work with deaf people either acquire skills in ASL or BSL or obtain the services of an interpreter. Such a requirement changes the status relationship between hearing and deaf people, and makes communication as much a responsibility of the hearing as of the deaf person. Attitudes are changing, but most of us are still unwilling to make the switch. Therefore, we continue to suppress ASL or BSL as the chosen languages of the deaf people. (p. 174)

Although the theoretical and empirical research presented in this report strongly support the effective use of native sign language for acquisition of majority languages, we add a further caution--that the substitution of one communication system for another is not the only answer to the current educational dilemma. A change in philosophy and the resulting changes in approaches and methodology are also necessary to provide long-lasting and satisfying solutions.

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